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Pressing Ahead with Modernisation

BRIEF reference was made in the Queen's Speech at the opening of Parliament on Tuesday, to implementation of the plan for modernisation and re-equipment of British Railways. In order to develop a sound system of communications throughout the country, it was stated, "my Government will press forward with their policy of building new highways and improving existing roads. They will encourage further modernisation of the railways and will devote special attention as to the future of the aircraft industry." This is the signal to go ahead with implementation of the plan as amended. The last Parliament accepted the report containing the re-appraisal of the plan on July 29. All parties then expressed themselves in principle in favour of pressing ahead with implementation. Some Opposition Members showed concern at the financial position of the British Transport Commission, drawing attention to the extent of its accumulated deficit and indebtedness to the Treasury in respect of loans. The amendments in the modernisation plan were stated by the last Minister of Transport & Civil Aviation, Mr. Harold Watkinson, to have been made by the Commission on its own initiative, supported by the Area Boards and senior officers of British Railways. With an increased majority, the Government is unlikely in the foreseeable future to require any curtailment of expenditure on the railways, provided that there is evidence of effort in every direction, on the part of railway managements and staff, to increase efficiency and effect economies. Those immediately concerned with carrying out the modernisation plan and with detailed planning of its later phases can be reasonably sure of no further major distracting alterations, apart from those necessitated by developments in techniques or possible shortages of manpower or materials. As regards improving plant and equipment, the outlook for British Railways seems better than it has been for some years, but their financial problems which loom ahead will have to be dealt with, and soon. No mention was made on Tuesday of concrete proposals to solve these difficulties. Capital investment in the railways is £178,000,000 during the current year.

A Notable Half-Century

TO have completed a full fifty years of service on work for what are now British Railways and the London Transport Executive is a notable achievement. That will be Mr. V. A. M. Robertson's record next month, for it was in 1909 that he was articled to a consulting engineer to the London & North Western Railway. Since then he has held a variety of prominent positions, both in and out of the railway service. On the formation of the London Passenger Transport Board he was Civil Engineer to the Underground Railways, and he retained that position with the new Board. In 1943, when he was Engineer-in-Chief, he resigned to join the Southern Railway where he became Chief Civil Engineer, a position which he held until 1951, having seen the transition from private to nationalised enterprise. The high esteem in which he was held, in even wider circles, has been marked by the presidencies of the Institution of Civil Engineers, the Smeatonian Society of Civil Engineers, and of the Permanent Way Institution, and the chairmanship of the Association of Consulting Engineers. He is also an Honorary Member of the American Railway Engineering Association and an Honorary Fellow of the Society of Engineers. When Mr. Robertson retired from British Railways in 1951, he became a Partner in the firm of Sir William Halcrow & Partners until April this year. Since then he has been a full-time Consultant to that firm and responsible for all the railway work it carries out.

Economies Due to Use of Aluminium

THE economies reported to be derived from use of aluminium in wagons in the U.S.A. are striking. The bogie coal wagons recently acquired by the Southern Railway System of U.S.A., which have aluminium bodies on steel underframes, cost $20,000 each. This is stated to compare with $12,500 for the existing standard all-steel coal wagon, and not $7,500 as stated in this journal last week. The aluminium-steel coal wagon has greater capacity, 103 tons, whereas that of the all-steel hopper wagon is 74 tons. The tare of the aluminium-steel wagon is 22½ tons, and gross weight 125½ tons. The comparable figures for the 70-ton steel hopper are 31 and 105 tons. To obtain a true comparison in view of the smaller payload of the all-steel wagon, the cost of the latter should be increased by some 40 per cent, to about $17,400. The additional capital expenditure involved in the use of aluminium for a 103-ton capacity wagon is some 15 per cent. Against this must be reckoned the reduced expenditure on maintenance caused by corrosion of the steel plates, and the much greater value of the scrap aluminium when the aluminium-steel wagon reaches the end of its useful life.

N.U.R. Wage Claim

IN direct opposition to his known views, Mr. S. F. Greene, General Secretary of the National Union of Railwaymen, last week presented the British Transport Commission with a claim for a substantial pay increase for 370,000 members of his union. The claim was made at a meeting of the Railway Staff National Council—the second stage of the railway negotiating machinery. Although the retail price index has fallen by one point since the three per cent pay increase awarded to railwaymen last June, the union bases its claim on a rise in the cost of living. A subsidiary demand is that the staff should participate in the benefits accruing from the modernisation plan and the various economy measures arising from it. The

union's invariable cry—that the pay of its members compares unfavourably with that of similar workers in other industries—has been dropped for the moment: presumably until the findings of the Guillebaud Committee are made known. As these may not now be published until March next year, and as the Commission is unlikely to grant any pay increases in the interim, it is probable that Mr. Greene will have to face some stormy meetings with his membership during the next few months.

Increased Steel Production

THE rise in steel production in Britain has continued. The Iron & Steel Board reports that production averaged 426,400 tons a week in September, compared with 368,600 tons in September last year and 438,200 tons in September, 1957. Output has thus risen to within about 3 per cent of the 1957 figure, the highest September figure ever reached. Production is believed to be likely to rise further as additional capacity becomes available at the strip mills and as demand increases in other sectors of the industry. The hope was expressed in the annual report of the Board for 1958 that as a result of new capacity home supplies would expand sufficiently to meet the rapidly growing demand and remove the need for imports by about the end of this year. As a result of initial troubles with new plant, the expansion is proving slower than expected. Increased activity in the industry is reflected in railway traffics, as reported last week.

New Method of Design Calculation

THE force matrix method of design calculation devised by Professor J. H. Argyris of Imperial College, London University, and referred to by Mr. K. P. Brockway, Railway Development Engineer, British Aluminium Co. Ltd., in his recent paper to the Institution of Locomotive Engineers (editorial reference last week) may present a new aid towards good rolling-stock design. The chief advantage of the new method would appear to be its thoroughness—using it, the designer chooses the number of loads and members to be taken into consideration, and is able to calculate all values extremely accurately. An apparent recommendation for the method is suggested by the fact that the Aeronautical Council has chosen to communicate it to the Ministry of Supply. It would therefore appear of interest to have further knowledge of force matrix calculation, which can be applied to structures of any metal or metal alloy. An opportunity for the spread of this knowledge will occur at the Joint Symposium to be held on May 27, 1960, by the Institution of Locomotive Engineers and the Aluminium Development Association, when the application of aluminium to railway rolling-stock will be discussed. Perhaps Professor Argyris will be invited to present a paper on his new method.

Re-planning British Railways

RECONSTRUCTION of the British railway system in physical terms and in the pattern of services and charges was advocated by Mr. C. E. Whitworth, Assistant to General Manager, British Railways, Eastern Region, in his comprehensive paper read last week to the Institute of Transport South Eastern Group at Ashford. The purpose of reconstruction was to adapt the railways to present conditions and to make them competitive in those functions in which, with proper equipment, they could offer the best service and lowest true costs. Technical modernisation was only a tool, which if misdirected might lead to further economic loss. The paper, entitled "Some Impacts of Air and Road Transport on Railway Economics and Practices," abounds in challenging statements, the result of clear and original thinking, which space does not allow to be reproduced. Mr. Whitworth pointed out that even before the advent of road competition, the railway system of Britain, despite the technical efficiency of the railway companies and the high standard of service, was basically, in economic terms, a high-cost one. He suggested six principles for re-planning railway service: concentration of traffic on fewer stations; rationalisation of installations, services and working, especially for freight; new methods of freight carrying and terminal handling; effective use of the railway speed potential; maximum use of equipment; and intelligent rate quotation and sale of transport.

Ulster Transport Consultative Committee

ESTABLISHMENT in Northern Ireland of a transport users' consultative committee, now planned, would do much to improve relations between the public and the Ulster Transport Authority, which provides public rail and road passenger and goods services. The Minister of Commerce, Lord Glentoran, stated in the Northern Ireland Parliament last week that the proposed body would resemble the Transport Users' Consultative Committees in Great Britain. The U.T.A. recently has been making efforts to explain the facts about its activities to the public. Lord Glentoran is right in his belief that something more should be done, and that it will help the public and the Authority if the individual user of U.T.A. services is given means of airing his complaints and can satisfy himself that they are being properly examined. The Authority welcomes the setting-up of a committee as proposed. Its members will include people chosen from trade bodies and other representative organisations. The public in Northern Ireland has tended to make merely destructive criticisms of the railways and other public transport. The duty of the new committee to make recommendations on matters referred to it will help to engender a spirit of responsibility.

D.E.U.A. Contribution to Diesel Technology

THE report of the Diesel Engineers & Users' Association was presented at the recent annual general meeting of the Association by the retiring President, Mr. D. S. Dodsley Williams. It shows that the D.E.U.A., founded in 1913, continues its valuable contribution to the knowledge of internal combustion, and especially diesel engines, including those used for railway traction. Important in the D.E.U.A.'s work is its "Report on heavy oil engine working costs and performance." The first of these annual reports appeared in 1923. They are concerned with more than 100 diesel-powered installations in many countries. They deal with the development of the oil engine, and provide good fields for free interchange of ideas and opinions between users, consultants, and designers. Such discussions on the problems as they emerge in many parts of the world contribute much of practical value to progress. The newly-elected President, Mr. James Calderwood, has referred to the changing character of diesel engine usage and to the problems which such changes produce for designers and users.

Enforced Manpower Wastage on U.S.A. Railways

THE extent to which "featherbedding," unnecessary employment of staff because of trades union insistence on certain hours and conditions, affects railways in the U.S.A. is shown in an advertisement by the Illinois Central Railroad appearing this month in newspapers published in the regions served by the I.C.RR. A pictorial diagram shows that for one diesel-hauled goods train covering the 903 miles from Chicago to New Orleans in 31½ hr., seven train crews are now required. Each consists of five: engineer (driver), fireman, conductor (guard), head brakeman, and flagman. All the firemen are unnecessary, and the train could be worked by four crews of four if they worked 8 hr. a day instead of an average of 4½ hr. A statement in the advertisement over the signature of Mr. Wayne A. Johnston, President of the I.C.RR., stresses the waste of manpower. Of every dollar received by the railway, 57¼ cents is paid in wages. Featherbedding, it is pointed out, costs the American railways, and the public, half-a-billion dollars a year. This expense, and over-regulation and Government discrimination, has lost the railways "a vast volume of traffic," and greatly curtailed the number of jobs which could be provided on the railways.

New Power Signalling on the Loetschberg Railway

THE privately owned railways in Switzerland, like the Swiss Federal Railways, have gone far in the application of newly developed signalling improvements. They have replaced much mechanical equipment with electrical and installed many colour-light signals. Some of these installations have been described in our pages. Elsewhere in this issue is an account of the work completed recently at Spiez on the Berne-Loetschberg-Simplon Railway. It replaces the electro-pneu-

matic signalling, using low-pressure air, brought into service in 1914 and for some years the only power installation in Switzerland. Constructed on the plan then common in many parts of Europe, it consisted of a central supervisor's frame controlling others in subsidiary signalboxes, from which the movements of the points and signals themselves were effected. The block working was carried out by the supervisor. In the new and larger layout a route-setting supervisor's panel deals with all running movements and another panel in the signalbox controls the shunting operations. At less busy times the box can be closed, leaving the whole of the working in the supervisor's hands.

Diesel Locomotives for C.I.E.

STEAM traction was completely eliminated from regular service on the 5 ft. 3 in. gauge lines of Coras Iompair Eireann during 1958, though a few steam locomotives were kept in reserve, pending the delivery of further diesel units. The Board of C.I.E. has adopted the principle that sufficient diesel locomotives should be provided to haul the goods services which on the C.I.E. system operate mainly at night, and that these locomotives should be used during the day to haul passenger trains. It is with this policy in view that tenders have been invited for the supply of 15 mixed-traffic diesel locomotives of not less than 800 h.p. and a top speed of 70 m.p.h., 14 shunting locomotives of not less than 400 h.p. with a top speed of 45 m.p.h. and 14 spare engines and transmission equipment, and seven diesel shunting locomotives of not less than 160 h.p. with a top speed of 25 m.p.h. Any additional motive power necessary for passenger services is being successfully met by the use of diesel railcars, and an availability of 80 per cent from both railcars and locomotives has already been achieved.

Level Crossings in Switzerland

AS in other countries, the managements of the Swiss railways have had of late years to give increasing attention to the level crossing problem. On the Federal system alone, which covers about 1,808 route miles, there are 3,996 crossings of various classes. Of these 1,630 have full-length lifting barriers operated by gatekeepers, or occasionally from a near-by crossing or station. Five are equipped with flashing lights and automatic half-barriers and 102 have flashing lights only. There are 1,289 locations practically resembling the occupation crossing, as known in Great Britain, where there are neither barriers nor lights, and 970 little-used country road or footpath crossings where users have a clear view of the trains, which are required to whistle as they approach. Various arrangements are in use for warning the gatekeepers, in some cases combined with the operation of the interlocking block, to combine safety with the minimum of delay to road users. The automatic half-barriers have so far proved to be very satisfactory; they require good discipline and understanding on the part of the public. Of late years, by agreement with highway authorities on the question of costs, certain crossings have been replaced by bridges.

Selection and Training of Railway Staff

THE advantage of flexibility in the training of railwaymen for senior positions and in appointing them is one of the many points stressed by Mr. H. C. Johnson, General Manager, British Railways, Eastern Region, in the Presidential address which he gave last Wednesday to the Railway Students Association. There must not, he believes, be too much rigidity as regards movement between grades, but rather a constant search, among outside railway staff for instance, to find young men of the right type who for some reason have not gained entry to the clerical grades. His view that the first duty of every man, from the General Manager downwards, who controls staff, is to take a live, personal interest in the selection, training, and development of staff will be accepted in principle by many senior railway officers, but in an industry which employs so many it is impossible for those in the highest positions to assess the capabilities of more than a few of their subordinates. Great skill, judgment, and knowledge of character are needed in choosing those to whom the responsibility must be delegated of judging the character and potentialities of younger staff, whether already serving on, or applying to join, British Railways.

As to recruitment, the attractions of a railway career can be claimed to be better than before the war, and are steadily improving, as Mr. Johnson states. There are certainly fewer dirty, tedious, and menial jobs. Reorganisation, more particularly in the traffic field, is opening up wider and more interesting possibilities for recruits. Mr. Johnson believes that more could be done to encourage the tradition of the railway family, because that background has resulted in recruitment of young men and women of the best type.

In training for promotion, there should be movement not only between grades, but also between stations and depots, and from that level into districts, and beyond that to headquarters. A man who moves back from headquarters to district is often all the better for the headquarters training and experience. Some of the younger staff, Mr. Johnson suggests, could well spend time with British Road Services, for instance, and the bus companies associated with British Railways. Certain people might even be seconded to a few of the larger firms with whom the railways do business, to study their transport and marketing problems. A little has already been done in these directions, and the experiments have proved encouraging.

On the traffic side, the schedule of training on British Railways has been remodelled in the light of the recent reorganisation and of the changes in traffic problems generally. A change has been made in shortening the period during which the traffic apprentice is merely absorbing detailed information and in ensuring that a large part of his training requires him to act on his own responsibility and to use initiative. With the idea of training being made as broad as possible, there is, he suggests, a case for the traffic apprentice spending a little time on the engineering side, so as to obtain a general idea of what engineering is about, and what the engineer is required to do for the traffic department. The engineering graduate or apprentice should get out of the shops occasionally and see what is happening in the sheds and depots, and in the traffic field generally.

On the whole, Mr. Johnson maintains, the training schemes for management work well. There is evidence that they have produced efficient officers, but there is no room for complacency. There is serious shortage of promising men in the 35-50 age group, because the railways had to abandon the training schemes during the war, and many young men of the immediate pre-war generation decided to seek their fortunes in the more remunerative fields then open, rather than return to the railways after demobilisation from the fighting services. He does not propose to abolish the system of advertising posts, so long established. There is, in his view, too great a readiness to assume that the progress of certain individuals smacks of unfairness. There may be such cases, for no system can be perfect. The unfairness and serious loss of efficiency rather should be borne in mind which results when keen, intelligent, and ambitious men are passed over, or, worse still, not even noticed. Hope deferred breeds frustration and destroys morale.

Maintaining the Standard of Passenger Travel

THE raising of British Railways ordinary fares from next Sunday is an indication of the confidence of the British Transport Commission that the railways will not be priced out of the market as regards journeys for which a choice exists of the means of travel. Despite the growth of personal transport many season ticket-holders, unless they change their places of residence and work, have no practical alternative to travel by rail. Over longer distances the situation is different. Other forms of transport, public and private, exist and each usually offers some advantages. The train can offer speed, comfort, restfulness, and other amenities en route. In that respect it retains, even in this country of relatively short distances, its attraction for the traveller on business. This is borne out in the latest available statistics. The receipts of British Railways from full fares, derived largely from business travel, in July were £9,739,000 against £9,704,000 in the same month of 1958. Total passenger journeys originating in July

were 0·1 per cent below the corresponding figure for last year, but first class journeys showed an increase of 9·2 per cent for the whole system, and of over 12 per cent in the Eastern, Southern, and Western Regions.

The reception by the public and Press of the new increases has been on the whole reasonable, at least as regards ordinary fares. Reasonable people realise that the nationalised transport undertaking must pay its way, that the additional £8,000,000 a year expected to be derived by British Railways from the increases is needed to help reduce the deficit on railway operation, and that increase in fares is equitable in the light of higher prices. Nor is a farthing a mile, second class, a considerable sum compared to the increases in prices of many consumer goods. It remains to be seen whether the increase in ordinary fares, effected when the number of private transport vehicles placed on the market is growing, will result in a decline in railway travel over medium and longer distances. The tapering of the increase to 0·1d. for 200-300 miles, and the decision not to apply it to over 300 miles, are wise measures. Anglo-Scottish traffic, that is, over distances of 200 miles and over, is likely to become increasingly susceptible to air competition.

The quality of the service, in comfort, speed, and punctuality, supplied in return for the fare, is of the utmost importance just now. The standard of service which will be provided after completion of many new diesel locomotives and multiple-unit trains, of new stations and other civil engineering works, and of re-signalling in implementation of the modernisation plan, and after electrification of some main lines, will be excellent. What matters now is that a high standard be maintained during the intervening period of upheaval and of virtual re-creation of large parts of the system of British Railways. It may not be possible greatly to increase speeds during this period. In many cases decelerations have been, and will prove, necessary before the faster trains can be introduced. The public is being given ample information about timetable changes. Nor is it possible to improve the comfort of existing rolling stock in service, apart from keeping it clean. On many lines, for many months to come, the burden of maintaining the standard of passenger transport will fall on enginemen, signalmen, station staffs, district operating headquarter staff and others whose duty it is to ensure punctuality. Station staffs and carriage cleaners must work harder and be more vigilant than ever to see that station premises and coaching stock are clean. These staffs will need all the encouragement they can get in work which may seem to lack the glamour of the more creative aspects of railway modernisation and re-equipment. Yet it is only by maintaining and improving the standard of service until much greater improvements are possible that the latter are made worth while. It would be of no avail to make provision for customers who melt away in the meantime.

The Engineer, Life, and Diesel Engines

NATURAL phenomena embracing the relationship of minute protons and electrons in atomic physics and the part which the engineer plays when seen against the background of the entire universe itself, were outlined in the Presidential address given before the Institution of Mechanical Engineers in London recently by Mr. Desmond H. Carter, Chairman & Managing Director of Crossley Brothers Limited, Manchester. "The Engineer, Life, and Diesel Engines" portrays, philosophically, the relationship between the people who hold responsibility for guiding the progress of engineering creation and the deep moral implications and physical importance of their struggles and achievements both in times of war and peace.

Mr. Carter used for his main subject the development of exhaust pulse pressure charging (E.P.P.C.) as on current Crossley rail-traction port-controlled loop-scavenge two-stroke diesel engines. The ultimate design may be taken as a classic example of mechanical simplification resulting from many years of research and experimenting to achieve better filling of the engine cylinders and so increasing the power available from a given size of unit. The good results were particularly satisfying to him because of the difficulty of merging the processes of exhausting, scavenging, and charging which, in a four-stroke engine, are looked after by separate strokes and separate valves. The subsequent adoption of exhaust-turbo pressure charging additionally to give a further power increase of 50 per cent was possible because the two effects are additive.

E.P.P.C. is the harnessing of exhaust pulsations to pressure charge each cylinder in turn by returning some of the excess scavenge air which flows into the exhaust branches. This improvement in engine cylinder breathing was a most exciting development which immediately produced results far in excess of any other single improvement of which his firm had had experience. The high trapped charge pressure does not require a high scavenge air pressure and the system is independent of the exhaust pipe length. It is dependent on the length of path from one cylinder to the next in sequence and on the length of the first few feet of primary exhaust pipe used for open-ended reflection of the pulses with sign reversed.

Diagrams show how, on the turbo-charged engine, the positive pulses are still there and are increased in energy content, but the base line from which they operate is raised bodily by the higher pressure levels produced by the exhaust turbo-charger. The attainment of a trapped charge pressure of 22 lb. per sq. in. on the turbo-charged engine with an air manifold pressure of only 12 lb. per sq. in. shows the effectiveness of E.P.P.C. under exhaust turbo-charged conditions. Without it the pressure of the trapped charge would only have been about ½ lb. per sq. in. above the manifold pressure.

The rapid development of greater specific output from turbo-charged diesel engines has raised the problem of high temperature at the top piston ring in the case of the two-stroke engine. But, Mr. Carter believes, this can be accommodated by future development; it is more severe than on the four-stroke engine but less so than on the free-piston gas generator. The latter breathes uncooled air under substantial pressure from the compressor portion, the high temperature being necessary for the best efficiency of the gas turbine part of the equipment.

The two-cycle turbo-charged diesel engine currently has a brake mean effective pressure in the region of 120 lb. per sq. in. (equivalent to 240 on the four-stroke engine) and exhaust temperatures in the region of only 900°F. Mr. Carter points out that designers of turbo-charged four-stroke engines are already having to take measures to stop the exhaust-gas temperature rising above 1,200°F. Thus, he argues, there is considerable scope for boosting the output of the two-stroke turbo-charged engine before high-temperature problems of the exhaust turbine arise.

The inherent advantage of all types of reciprocating engine to withstand temperatures in the region of 2,000°C. enables fuel consumption figures to be obtained which are about half those of current commercially practicable gas turbines, an advantage which is substantially increased in locomotive applications under service operating conditions. This leads to the logical suggestion that the main field for the gas turbine may well be in the role of the exhaust turbo-charger of a conventional diesel engine after the reciprocater has efficiently coped with the high-temperature part of the cycle and has taken the keen edge off the hot gases.

An engineering product not only has to function well but also it must be an economic proposition. Many attractive schemes do not mature purely on account of too high a cost of manufacture. The engineer looks at his cost figures; in fact they are vital to him in making his choice and deciding his course of action. A warning is given to the engineer who allows those in authority to think, erroneously, that he is not concerned with the economics of his profession. By being concerned only with his "ironmongery" and proclaiming ignorance of anything outside the narrow confines of engineering he subjects himself to control by men in other fields, of possibly less intelligence and ability.

Mr. Carter comments on the effect which the size of a firm can have on labour relations. His opinion is that the grouping of men in progressively bigger concerns, which started from the need to take advantage of mass production, and the substitution of impersonal systems for the warm human relationship which might otherwise exist, has been one cause of labour unrest and strikes in concerns which pay the highest wages. It seems desirable, he contends, to have for an aim organisations large enough to purchase and operate the expensive capital equipment needed to do the job efficiently but no larger, because the bigger they become the more remote is management from the rest of the team and the less human its affairs.

Eastern and North Eastern Regions Winter Timetables

AN important addition to the up morning service from North Eastern England to Kings Cross is the "Tees-Thames," a new through restaurant car express from Saltburn at 7.5 a.m., calling at Redcar, Middlesbrough, Thornaby, Eaglescliffe and York, and non-stop from there (at 8.48 a.m.) to Kings Cross, arriving at 12.15 p.m. This replaces the former "Tees-Thames Link," a diesel multiple-unit set which left Middlesbrough at 6.50 a.m. and connected at Doncaster with the 7.52 a.m. from Leeds to Kings Cross; this does not now proceed further than York.

The new service affords through working and refreshment facilities throughout. Southbound it is 15 min. quicker from Middlesbrough to London than the old. On the return journey the "Tees-Thames" takes over the former 2 p.m. from Kings Cross to Newcastle, which is diverted from Northallerton to run to Middlesbrough and Saltburn, arriving at 7.23 p.m.; passengers for Darlington and Newcastle change at York into the 5 p.m. diesel train from Leeds to Newcastle, which takes the main line instead of the coast line from Northallerton. The previous 9.15 a.m. train from York to Kings Cross now runs attached to the "Tees-Thames," and, to pick up the through portion of the former train from Hull, the 8 a.m. from Newcastle to Kings Cross starts at 7.56 a.m., and stops at Doncaster instead of York, reaching London at 1 p.m. instead of 1.6 p.m.

In the down direction the 7.50 a.m. "Morning Talisman" from Kings Cross is starting at 8.10 a.m., and running 20 min. later throughout; while the 8 a.m. to Leeds, which once again has become a restaurant car train throughout, leaves Kings Cross at 7.50 a.m. and runs 10 min. earlier. This train has taken over the name "West Riding" from the 3.40 p.m. down. There is a diesel connection off the 7.50 a.m. from Doncaster to Hull; also the 8.20 a.m. from Kings Cross is extended from Doncaster to Hull and is a restaurant car train throughout.

In the North Eastern Region there are further extensions of diesel multiple-unit working; diesels have now taken over the local services between Huddersfield and Penistone, Clayton West, and Bradford by both the Halifax and Cleckheaton routes; also some of those between Huddersfield and Marsden, and more than previously in the Durham area and between Newcastle and Carlisle, together with the Haltwhistle-Alston service in full. Most of the services concerned have been amplified and accelerated.

For the time being, schedules over the Colchester main line of the Great Eastern Line are badly affected by electrification work between Chelmsford and Colchester, and all express trains between Liverpool Street and Clacton-on-Sea, Yarmouth and Norwich have had 10 min. added to their schedules. The times between Liverpool Street and Yarmouth by the East Suffolk line suffer also by the closure of the direct line from Beccles to Yarmouth South Town, all the trains now running via Lowestoft Central and reversing there; times from London to Yarmouth have been increased by 29 min., and in the opposite direction by 25 min. London-Yarmouth passengers can, however, save time by using the fast Liverpool Street-Norwich trains and diesel connections between Norwich and Yarmouth Vauxhall.

This winter, for the first time since the war, the "Hook Continental" is continuing to leave Liverpool Street at 8 p.m., despite the difference between British and Continental time, which is made up by accelerating the work at the ports and the steamer journey. The North Country Continental train between Harwich Parkeston Quay and Liverpool is diverted between Lincoln and Retford to run *via* Gainsborough, because of the impending closure of the direct line between Sykes and Clarborough Junctions, but with very little alteration in running times; the southbound train, by the insertion of liberal recovery times into its schedule south of Ely, is 15 min. later into Parkeston Quay.

In the London area, Great Eastern season-ticket holders from Bishops Stortford have had their service improved by new diesel trains at 7.23 a.m. up and 6 p.m. down, calling only at Harlow, Burnt Mill, and Broxbourne, and taking 55 and 56 min. respectively. The former 8.24, 9.54 a.m., 12.24, 7.24, 8.54 and 10.24 p.m. down Cambridge line trains are all starting 4 min. earlier, and in common with the remaining services in both directions have 4 min. added to their schedules because of electrification work between Cheshunt and Bishops Stortford. A feature of the Eastern Region timetables is that they distinguish clearly between full buffet car services and trains equipped with miniature buffet cars only, a useful indication to travellers of the variety and cost of the refreshment facilities available to them on their journeys.

Freight Traffic and Rolling Stock Statistics

(*By a correspondent*)

IN four weeks to September 6, British Railways originated 16,351,000 tons of freight train traffic, 244,000 tons, or 1·5 per cent, less than in 1958. Receipts accruing from the traffic were down by £1,045,000 at the disproportionate rate of 5·7 per cent. Though merchandise (including livestock) increased by 134,000 tons, or 5 per cent, it produced £164,000 less revenue despite the steady growth of the average haul, which led to an increase of 6·6 per cent in merchandise ton-miles.

In contrast the mineral receipts were 4 per cent higher and mineral ton-miles rose at much the same rate, while the railways carried only 78,000, or 2 per cent, more tons. Developments in coal transport were quite different. With a decrease of 456,000, or 4 per cent, in tonnage, receipts fell by nearly £1,000,000, or 12 per cent, and 73,000,000 fewer coal ton-miles were worked. This decrease of 12 per cent was caused to some extent by a shorter average haul, but the National Coal Board policy is bound to lessen the quantity of railborne coal.

A comparison between Period 9 and the corresponding weeks of 1953 shows that in six years our railways lost one-fourth of their merchandise traffic and one-fifth of both mineral and coal carryings. In consequence the volume of freight movement dropped by 447,000,000 ton-miles, or nearly 27 per cent.

Operating Statistics

We now have traffic statistics for the first 36 weeks of this year, when originating tonnage, wagon loadings, and ton-mile volume were all 7 per cent below the level for the poor year 1958. The railways reduced freight train-miles by 4,505,000, or 5 per cent, to 82,921,000. They cut freight train engine-hours in traffic by nearly 7 per cent and shunting engine-hours by 8 per cent. The train load of 144 tons was 2 tons below the 1958 figure and 15 tons behind 1956. Light loading helped to raise freight steam train speed to 9·63 m.p.h. against 9·47 last year and 9·09 in 1956, but spoiled the hourly output of freight train operation, which at 1,130 ton-miles was one up on 1958 but 58, or 4 per cent, below 1956 productivity. Wagon-mile figures also indicate a loss of mobility since that busy year. This year's aggregate was 5 per cent lower, while 219 wagon-miles were worked in a train hour—four more than in 1958, but five less than in 1956.

A scrutiny of the Regional figures shows that the Eastern Region kept a fairly firm grip on its traffic and worked it frugally. Its tonnage declined by little more than one per cent, though the ton-mile volume was 4 per cent less. The Eastern wagon load of 9·89 tons was exceeded by the North Eastern average of 11·6 tons, but its train load of 162 tons, and its output in a train hour of 1,270 ton miles and 230 wagon-miles were the best results. The Eastern steam freight train speed of 9·3 m.p.h. was slightly better than the London Midland rate of progress, but was put in the shade by speeds of 10.2 m.p.h. in the North Eastern and 11·1 in the Scottish Region. In using diesel traction for freight movement, however, the Eastern led the field, running 798,000 diesel freight train miles—more than half of the all-line total—at an average speed of 9·8 miles an hour.

Rolling Stock

The statement of the operating stock and repair position at September 6 gives cause for concern, especially in regard to wagon supply. In September, 1958, the railways owned 1,042,769 freight vehicles, with over 6 per cent of the stock under repair. The number then available for traffic was 975,583. This year's stock was reduced to 947,040, with 79,030, or over 8 per cent, out of action, leaving only 868,010 vehicles available for service, 107,573 less than a year ago.

This reduction of 11 per cent is out of proportion to the current decrease in traffic. Now is the time to secure more business to rail, as many industries are active, and in particular iron and steel outputs are rising. An ample and prompt supply of wagons is essential. Rumours are circulating that some traffic has been lost recently because of wagon shortages and the situation clearly calls for immediate attention.

The state of the locomotive stock has also deteriorated. In March, 2,749 locomotives, or 16 per cent of the total stock of all types, were under repair. The "unserviceable" number fell to 2,642, or 15·5 per cent of stock, in June, but rose in September to 2,904 or 17 per cent of a stock which decreased in 36 weeks by 340. The "under repair" precentage for steam locomotives was 17·8, a high figure, but the steam class is ageing. It is more disquieting that of 313 diesel-mechanical and diesel-hydraulic locomotives 34 needed repairs. As 71 of these machines were installed this year, it seems unreasonable that more than 10 per cent of the total stock needed repairs. The state of the diesel-electric locomotives was worse, with 152 unserviceable—12 per cent of a stock of 1,224, of which 266, or more than one-fifth, came into traffic this year. Of 81 electric locomotives nine were out of order. This doleful catalogue points to an inflation of maintenance costs which may impair the success of either diesel or electric traction.

LETTERS TO THE EDITOR

(*The Editor is not responsible for opinions of Correspondents*)

Railway Wagon Loadings

October 22

SIR,—Statements of British and American railway wagon loadings during the first 36 weeks of this year are to hand. Our figure shows a decrease of 1,377,000 loadings, or 7 per cent, from 1958. Despite the steel strike, which began on July 15, American loadings were up 1,500,100, or 7 per cent. Compared with 1957, our loadings were down 18 per cent against a decrease of 13 per cent on U.S.A. railways.

On both railway systems, the number of wagons under repair in September was about 8·3 per cent of the stock owned. On British Railways the number of wagons available for traffic was 11 per cent less than a year ago, while the number of serviceable wagons in the States was only 2·5 per cent lower and the railroads had 42,320 new wagons on order, against 29,250 in September, 1958.

Our American friends will probably avoid the error which they made in the 1954 traffic slump, when they weakened their wagon stock until serious shortages occurred on the industrial revival of 1955 and 1956. The position of our railways is not so reassuring.

Yours faithfully,

R. BELL

Clacton-on-Sea

Bus and Train Travel

October 19

SIR,—I was surprised to read the observations in your editorial note of September 25 on the impossibility of country bus travel with more than one medium suitcase, bus connections with trains, and the alleged lack of railway information at bus inquiry offices. Your comments are certainly not in accord with the facts as far as my company is concerned.

I suggest that any impossibility, if it exists, of travel with more than one suitcase, arises from the inability of the passenger to carry it rather than from any restriction placed on the carriage of such baggage by the omnibus company.

The question of bus-rail connections is of prime importance in the area served by my company, and very close liaison exists between British Railways and ourselves. Since May, 1958, no fewer than 53 timetabled journeys have been retimed to meet altered train times or other conditions by anything from 2 to 14 min., and five additional journeys have been introduced specifically to connect with trains.

I would agree that in some cases bus services do not make ideal connections with trains, but there are usually good reasons for this. The local bus service caters for a wide variety of passengers, travelling into town for shopping, work, school, amusement, and so on, and bus timings have to take all these needs into account. Only a minority of the passengers may wish to make train connections, and it would be unreasonable to base bus timetables entirely on their requirements. Nevertheless, whenever possible, bus timetables are planned with train connections in view.

Railway information is available at all our inquiry offices and is certainly not hard to obtain as you suggest. Our principal offices have timetables for all Regions of British Railways, whilst the smaller offices are equipped with Southern Region timetables.

Although my observations refer to the Southdown company, I am sure they would be well supported by many other bus companies.

Yours faithfully,

A. S. WOODGATE
General Manager

Southdown Motor Services Limited,
P.O. Box No. 6, Steine Street, Brighton

[It is hard to find room for more than one suitcase per passenger under the stairs of a double-deck or in the longitudinal rack of a single-deck bus. Our comment in the September 25 issue was based on our experiences in several parts of Britain.—ED., *R.G.*]

Centralised Traffic Control

October 24

SIR,—Mr. D. H. Constable, of the Rhodesia Railways, comments in your October 23 issue on my letter published on September 4.

I attempted to point out that there was a great difference between true C.T.C. and the system generally known by that name today. Chapter I of the "History and Development of Railway Signalling," published by the Signal Section of the Association of American Railroads, makes that point quite clear, and the C.T.C. section of the Rule Books for the Southern Pacific and Santa Fe systems illustrates what true C.T.C. is.

We know that C.T.C. was a development from the written train order system that could, and did, unfortunately, result in a "cornfield meet." But the despatcher still only actually moved those points that were situated within the precincts of his station limit board. All other points were merely locked or unlocked by him, and the actual reversing was performed by a member of the train crew at the site.

Can this system honestly be compared with what Mr. Constable considers to be C.T.C. ? Just consider. Over two line wires, codes of carrier frequency impulses are transmitted and make it possible to control a number of locations or field stations, each of which operate different junction movements, hold the coded instructions in abeyance, if necessary, apply Rule 39A automatically, and could, if required, perform up to 500 controls in one second.

The first principles of the "time interval" system are not in the same category as the "absolute block system." So why this extremely clever remote control should be labelled Centralised Traffic Control beats me. I feel sure that it was the intention of the British Transport Commission to show some difference between the orthodox Route Relay O.C.S. and EN. EX. systems with that proposed for the re-signalling of the Central Wales area, and in consequence, the Commission referred to it as Centralised Traffic Control in its reappraisal of the modernisation plan for British Railways.

It has been my privilege to operate one form of panel of the Westronic series, and it is significant to see that it is referred to as "High Speed Transistor Single Station Remote Control and Indication System." I realise that this may be a purist's attitude, but it happens to be my point of view, and I am sticking to it.

Yours faithfully,

C. P. LOVEMORE, ASSOC. I.R.S.E.

13, Elliston Road, Redland, Bristol, 6

THE SCRAP HEAP

"Great North" Green Again

A locomotive of the former Great North of Scotland Railway, 4–4–0 No. 49, *Gordon Highlander*, has been painted in the G.N.S.R. livery, green with red and black linings. It was built by the North British Locomotive Co. Ltd. in 1920, to the design of Mr. T. E. Heywood, Locomotive Superintendent of the G.N.S.R. That railway in 1920 was painting its engines black as an economy measure. No. 49 never bore the "Great North" green livery until this year. With engines of the former Caledonian, Highland, and North British Railways, and G.W.R. *City of Truro*, all in their company colours, it hauled excursion trains to and from Glasgow during the recent Scottish Industries Exhibition.

Locomotive, in G.N.S.R. livery, which hauled excursion trains during the Scottish Industries Exhibition in Glasgow (see our September 18 issue)

Travelling Post Offices

In last week's issue it was reported that a new set of rolling stock had been introduced to work the "Great Western Travelling Post Office Down" between Paddington and Penzance, British Railways, Western Region. It was Sir Rowland Hill who first had the idea of sorting some of the mails in the interior of specially fitted coaches in the course of their journey. In January, 1838, a horse-box fitted as a sorting carriage was coupled to a train on the Grand Junction Railway running between Liverpool and Birmingham, and the first travelling post office was inaugurated. In the same year a special sorting carriage, fitted with apparatus which enabled bags of mail to be picked up and dropped while the train was in motion, was built and used on the line.

Conditions in the sorting carriages were austere in the extreme. The carriages oscillated considerably and mail addresses had to be deciphered and letters sorted in the light of primitive oil lamps which all too frequently tended to leak or overflow on to the sorters and letters below. The wax with which the mails were sealed had to be heated over a naked oil flame, and old records show at least one instance of the wax pot being upset, and the boiling contents spilling over an unfortunate member of the staff.

Hazards of Railway Survey in India

A vivid account in *The Times* of June 28, 1859, described an attack by hornets on two engineers and boatmen in the Nerbudda gorge near Jubblepore. They were surveying a bridge over the Nerbudda for the Indian Railway Company. One engineer, who had thrown himself into the water and was again attacked while clinging to a rock, was drowned. The other and the boatmen, though badly stung, survived. The marble rock gorge and the hornets are described in Kipling's story "Red Dog," in the "Second Jungle Book." The line surveyed became part of the Great Indian Peninsula (now Central) Railway. "This sad occurrence," *The Times* added, "has cast a very deep gloom . . . the more so as two young railway engineers engaged on this line a few weeks ago were barbarously murdered by the rebels at a place not 100 miles from this town (Jubblepore)."

Trains in Battle

The most startling news was the announcement that the Boers had destroyed a British armoured train on the Mafeking-Vryburg Railway. The report caused considerable excitement, it being assumed in many quarters that the train referred to was the one which had left Mafeking on Wednesday with the women and children from that town. Subsequent dispatches, however, showed that the train was returning north with a few troopers and guns.—*From "The Financial Times" of October 14, 1899.*

Radio Attack

A new resident of Ann Arbor, Michigan, was proud of the remote-controlled door of his garage. Pressure on a button in the car actuated the automatic opening and closing sequence. Just after midnight on the second night in his house, he was awakened by the sound of the automatic door opening. He reached the garage in time to see the door closing itself. Similar occurrences at the same hour led to the discovery that the radio frequency to which the door-operating gear responded was close to that of the radio sets for communication between driver and guard fitted in a goods train which passed nightly.

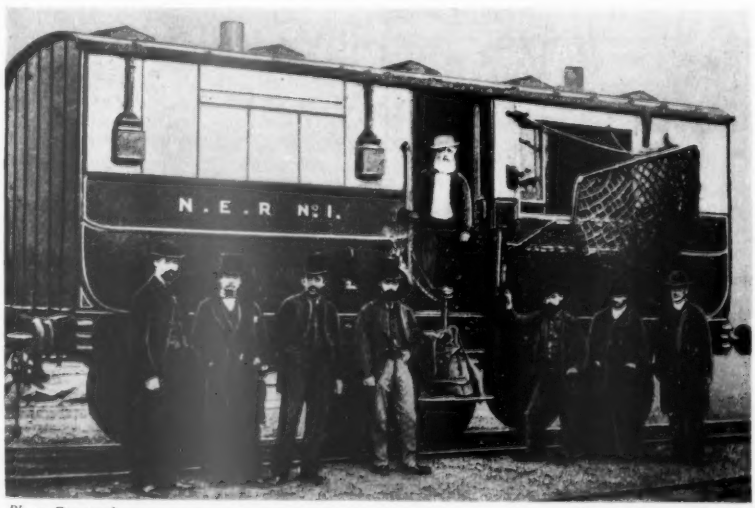


Photo Courtesy} {H.M. Postmaster-General
First travelling post office to go into service on the North Eastern Railway in 1881

Late Turn

When night's soft mantle covers all
And shadows veil the booking hall
The late clerk quietly sets the stage
For morning rush-hour's rude rampage.
The kettle on the gas-ring sings
Of little, half-forgotten things;
The foreman drops in presently
To share a friendly pot of tea.
The petty troubles of the day
Loom large no more, but fade away.
Then, as he locks up for the night,
He knows the unalloyed delight
Of duty done and rest ahead,
And long, luxurious hours in bed.

A. B.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Manufacture of Diesel Locomotives

Mr. G. H. Watson, Chairman of the Union Carriage & Waggon Co. (Pty.) Limited, Nigel, Transvaal, speaking on the occasion of the delivery of the first all-steel rail coach built in the Union, stated that the company had secured a licence from the General Motors Corporation to manufacture diesel-electric locomotives in South Africa. The company intends to make further extensions to the factory and so enable it to build these locomotives for export.

INDIA

Freight Rebate on Bicycles

As a part of the export promotion drive, the Railway Board has decided that a rebate of 50 per cent on freight should be allowed on consignments of bicycles and their component parts booked from Sonepat and Bahadurgarh to Amritsar for onward despatch to Afghanistan via Pakistan. The Board has laid down detailed procedure for booking for the guidance of the trade and for railway staff dealing with such consignments. The procedure is similar to that already in force for booking of export traffic by sea routes on which rebate is allowed.

Payment by Results

The question of introduction of payment by results in workshops on the Indian Railways was discussed between the Railway Board and representatives of the All India Railwaymen's Federation on September 28, 1959.

The incentive scheme, which is designed on the pattern in force at the Chittaranjan Locomotive Works was welcomed by the All India Railwaymen's Federation, and they agreed to extend their full co-operation in its implementation. The Railway Board was represented by Messrs. K. B. Mathur, Chairman, J. Dayal, Financial Commissioner, Karnail Singh, Member, Engineering, and other officers.

Similar discussions with the National Federation of Indian Railwaymen could not be held because of the absence of Mr. S. R. Vasavada, its President.

CHINA

Track Doubling

The double-tracking of the main line from Tientsin to Shanghai, 825 miles, has been completed with the exception of certain sections. Two more train-ferry steamers, making four in all, have been built to carry the increasing traffic on this line, and surveys for a bridge across the Yangtse to replace the train-ferry are being made. The double-tracking of the former Peking-Hankow Railway has now been completed to a point about 150 miles from Hankow. Double-tracking of the line running north-west from Peking to Tatung, the coal centre, 230 miles, has been almost completed. This line is at saturation point with coal traffic.

Peking-Moscow Service

A through service from Peking to Moscow via Ulan Bator the capital of Mongolia has been introduced. The line across the Gobi desert, built in 1956, is 700 miles shorter than the old Trans-Siberian route via Manchuria, and the journey time has been reduced by 9½ hr. Only one through train a week will take this route, and will not interfere with the daily service by the old route. Since the opening of the line services have worked daily from Peking and Moscow, but no through service has been worked. The usual sleeping and dining car accommodation is provided for first and second class passengers, the second class sleeping cars being of the four-berth type without cushions.

QUEENSLAND

Mount Isa Line Rehabilitation

The Queensland State Cabinet has decided to start work immediately on the rehabilitation of the Mount Isa line. At Roma recently, the Cabinet decided that the project could no longer be delayed and it was agreed to begin work on the weakest section of the line, the 242-mile length between Richmond and Duchess. This work will cost between £8,000,000 and £10,000,000 in the next five years and will be financed from State resources. The Queensland Government has abandoned any hope of a £22,000,000 loan from the World Bank and has sent a note to the Commonwealth Government asking what it may expect in the way of a grant or loan from the Commonwealth or overseas.

NEW ZEALAND

Goods Tonnage in 1958-59

The annual report of the Railways Department presented to the New Zealand Parliament shows that goods tonnage carried by the railways between April 1958 and March 1959 was the second highest annual figure on record and the number of passenger journeys by train was the greatest since 1949.

The report discloses that the net result of the year's operations of the Railways Road Services was a loss of £29,054, compared with a loss of £23,469 last year. Vehicle miles decreased by 139,081 miles, but expenditure still showed an increase of £40,122. This was due to petrol tax on fuel used in goods-service vehicles and a substantial increase in depreciation due to the new vehicles in service.

ARGENTINA

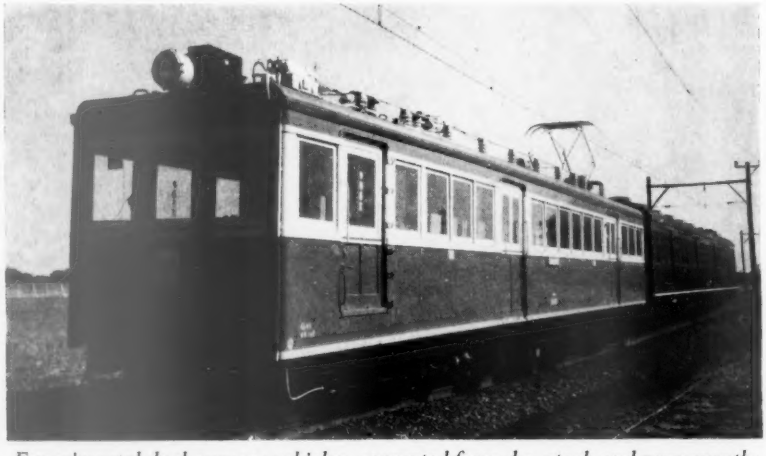
Rationalisation Plan

At a recent press conference the Transport Secretary, Eng. Castello, stated categorically that the Government did not intend to sell the railways. The rationalisation plan which had been referred to on several previous occasions was nearly completed, he said, and would shortly be sent to Congress. He could not give details as yet, but would say that an expenditure of 150,000 million pesos over a period of 15 years was contemplated. To begin with, a further increase in passenger and goods rates would be necessary, especially as railway staff were already pressing for higher salaries and wages.

The salient points which could be mentioned at the present time were: the unification of gauges, closure of unproductive branches, and fuller use of material now taken out of service for different reasons. There was a possi-

Dual-Purpose Electric Stock in Japan

(See last week's issue)



Experimental dual-purpose vehicles, converted from d.c. stock and permanently coupled. The leading car is a control trailer with a.c./d.c. change over switch, ignitron rectifier, and power transformer. The other is a motor coach

bility, he added, that private industry would be called upon in connection with re-equipment of shops, and construction of new lines and works. Part of the programme could be financed by the sale of surplus property. By the end of the year, he concluded, the situation would at least have been clarified, and some of the measures would be already in force.

Strike Action

Towards the end of September, the two railwaymen's unions decided to call a complete stoppage every five days as a protest against the non-implementation of the new pensions law. The first of these caused a complete stoppage all over the country, but before the second was due to take place, the Government announced that provisional increases of 1,000 pesos for superannuation payments and 700 for pensions would be granted until the law could be complied with in its entirety. The strikes were then called off, in spite of the fact that the second one would have coincided with a two-day general strike which had been called by certain sectors of the trade union movement.

BRAZIL

North-South Rail Connections

The link between North and South Brazil is scheduled for completion by June 1960. By then the ferry boat across the Sao Francisco River, connecting Proprio in Sergipe to Colegio in Alagoas, will be operating, permitting through running of trains from Rio Grande do Sul to Ceara. Tenders have been invited for the vessels, complete with all necessary equipment, from shipyards registered in Brazil.

FRANCE

T.A.R. Railcars Withdrawn

Introduction of electrified services in the Northern Region has led to the withdrawal of the last T.A.R. diesel railcar trains on the S.N.C.F. These trains were first introduced in 1936. Those working on the Paris-Lyons line were replaced by electric trains and those running between Paris-Amsterdam and Paris-Basle by T.E.E. diesel trains. The T.A.R. trains now replaced were operating between Paris and Lille.

SWITZERLAND

Zurich Local Traffic

In 1955 an investigation was undertaken into the traffic dealt with by the Federal Railways within 18 miles radius from Zurich, including 91 stations and 190 miles of route. The population of the city and suburbs is about 400,000. Movements to and from 85 other stations also were studied. The results appear in the S.F.R. official yearbook for 1958. Since 1938 travel within the city limits has been declining but regular journeys from and to the suburbs have doubled. Some 20 per cent of the season tickets are held by students and 40 per cent by workmen.

About 40 per cent of all the season ticket holders working in Zurich return home for lunch at midday. The heaviest traffic is between Zurich and Oerlikon, with 9,356,000 passengers per km. a year (excluding any travelling beyond there), compared with 2,156,000 per km. a year for the entire Federal Railways system. There is much valuable residential traffic between certain outer stations themselves as between Wallisellen and Winterthur.

AUSTRIA

Semmering Line Electrification

The completion of the electrification of the 25½ mile double-track Gloggnitz—Mürzzuschlag section, the most difficult stretch of the Semmering line, means that the line between Vienna and Mürzzuschlag is electrified throughout, a distance of 73 miles. The conversion of this Sudbahn section is to be extended to Bruck an der Mur, 25½ miles to the south-west of Mürzzuschlag, and thence on the two main lines: on the Sudbahn leading via Graz to Yugoslavia, and on the line connecting Bruck an der Mur with Carinthia.

Gloggnitz, formerly the station where ordinary steam locomotives were replaced by heavy mountain locomotives and vice-versa, is 48 miles to the south of Vienna. Electric traction between Vienna and Mürzzuschlag has halved the travelling times between these two places, and fast goods trains have gained even more time. The saving of coal means a reduction of the working expenditure of this stretch amounting to some Austr. schilling 20,000,000 a year.

Publications Received

The Concise Encyclopædia of World Railway Locomotives. Edited by P. Ransome-Wallis. New Horizon Books. London: Hutchinson & Co. (Publishers) Limited, 178–202, Great Portland Street, W.1. 10 in. x 7½ in. x 1¾ in. 512 pp. Fully illustrated. Price 50s. A great deal of information, well presented, is contained in this well-produced work. It is of value to those concerned with railways professionally who require a work of reference on locomotive practice throughout the world, and to the student seeking an introduction to the main principles of railway traction. One-half of the book is devoted to steam and contains an encyclopaedia of the components and design of locomotives including many detailed drawings, also informative chapters on the reciprocating steam locomotive, testing, traffic, and the organisation of a steam motive power depot. There is an illustrated survey of modern steam power, sub-divided into 10 parts dealing with different gauges and territories. Electric and diesel traction practices throughout the world are surveyed by well-qualified contributors who have provided much information of relatively recent historical interest on the evolution of present-day designs. Typical examples of most types of locomotive are illustrated in classified groups with cross-references to the text. In the diesel section, electric and hydraulic transmission systems are explained in detail with the aid of graphs and many useful drawings. Further chapters deal with the gas turbine in railway service, unconventional forms of railway motive power, and concise biographies of famous locomotive engineers. Appendices give the wheel arrangements for all types and a glossary of British and American locomotive terms, also a classified bibliography.

Processing Equipment for the Electrical Industries.—A 15-page bulletin issued by Controlled Heat & Air Limited describes Chal industrial heating plant for operations such as coating and baking the insulating varnish on transformer coreplates, enamel drying for copper wire, varnish impregnation, and paint and insulator drying. There are examples of plant designed for continuous and batch production, heated by gas, electricity, and steam. Particular attention has been paid to thermal efficiency and to the needs of flow-line operation. The range of plant is suitable for temperatures below 1,200°F. to use forced convection with the greatest efficiency. One illustration shows an oven into which large transformers can be placed directly by shop crane, through a roller-shutter aperture in both the roof and front. Another shows a spray booth for work up to 15 ft. wide by 20 ft. high and 30 ft. long. This has an extraction fan of capacity up to 25,000 cu. ft. per min. A typical coreplate varnishing plant shown consists of a roller coating machine, a backing oven and a forced cooling oven, using automatic transfer gear between the separate conveyor units. Battery plate and electric bulb drying are other processes described. Copies may be obtained from the Incandescent Heat Co. Ltd., Cornwall Road, Smethwick, Birmingham.

Decorative Protection of Timber.—Isocyne Four-Way decorative protection of timber is the subject of a brochure published by the British Domolac Co. Ltd. A clear protective lacquer can be applied easily by brush or spray to wood cladding, new industrial constructions made of timber, furniture, and equipment in laboratories, schools, and catering establishments. Isocyne lacquer is stated to enhance the beauty of timber while protecting it from light, heat, moisture, and chemicals. The brochure also claims for it extreme durability, lack of crazing, good anti-abrasion qualities, and resistance to burns from cigarette ends. There are several illustrations showing how Isocyne increases the architectural possibilities and industrial applications of timber, among these being a wood facing surround to ticket windows at a British Railways station. Prices, and instructions for mixing, application, and coverage are contained in a supplement. Copies may be obtained from the British Domolac Co. Ltd., Abbey Wood, London. S.E.12.

Hydraulic Dampers

Their performance and choice to meet vehicle requirements

By J. L. Koffman

Recording the natural frequencies of a locomotive. The operator controls the starting and stopping of the vibrograph. Wedges are pulled out of the way as soon as the locomotive has passed

THE riding qualities of vehicles as well as their effect on the track depend on a number of design factors, some of the most important of which are the natural and excitation or forcing frequencies of the various modes of oscillations and their amplitudes (1, 2, 3). While the natural frequencies depend on spring rates, vehicle masses, inertias, and suspension design, the forcing frequencies depend on the track and on the pattern of lateral wheel and bogie motion. The amplitudes of vertical body oscillations depend on the unsprung weight (4), the "effective height" of the obstacle, the ratio between frequency of excitation and the natural frequency of the mode concerned, and the damping factor of the oscillating system. As far as vehicle suspension incorporating steel springs is concerned, the number of damping characteristics can be limited to two; friction damping and viscous damping.

Friction Damping

The former occurs in every system and is maintained by friction forces acting in opposition to the motion. As the damping force K (lb.) is substantially constant, the peaks of the decaying oscillation amplitudes will be connected by a straight line, the amplitude of the oscillations at the end of each cycle being reduced by the amount 4k (in.), where with c (lb. per in.) as the spring stiffness, $k = K/c$.

With true (theoretical) viscous damping the damping force opposing the oscillation is proportional to the velocity of the latter. Many hydraulic dampers* meet this requirement over the lower range of their characteristic, which is usually adequate for the velocities considered here. The resisting force is represented by a proportionality factor p referred to as coefficient of viscous damping or damping resistance, its dimension being force (lb.) divided by velocity (ft. per sec.), so that p (lb. sec./ft.). With viscous damping the degree of damping is usually expressed in terms of the relative damping factor:–

$$D = \frac{p}{p_{cr}} = \frac{p}{2\sqrt{mc}} = \frac{p}{2m\omega}$$

where m (lb. sec.^{2} per ft.) is the mass of the oscillating system, c (lb. per ft.) the spring stiffness and ω (radians per sec.) the natural angular frequency, while p_{cr} (lb. sec. per ft.) relates to critical damping. With the latter, the motion will just cease to be a "vibration," but rather a creeping back to the equilibrium position. The relative damping factor D is thus a non-dimensional magnitude relating to the critical damping :–

$$D_{cr} = 2\sqrt{mc} = 2m\omega$$

taken as unity (and not as 100 per cent as sometimes stated).

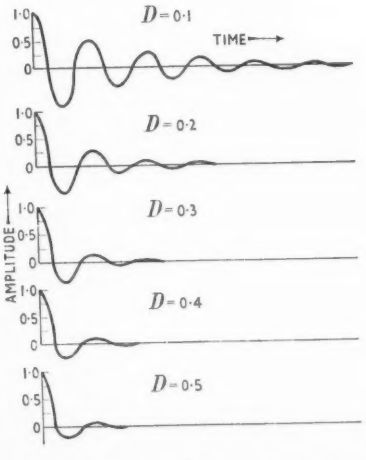


Fig. 1—Effect of damping on the pattern of vibration decay. This pattern can be used to assess the damping factor of the system

Ratio of Amplitudes

The ratio of the amplitude X_m of one oscillation to the amplitude X_{m+1} of the following oscillation is given by

$$X_m/X_{m+1} = e^{\delta}$$

where e = 2·7183 is the base of the natural logarithm, while

$$\delta = \frac{2\pi D}{\sqrt{1-D^2}}$$

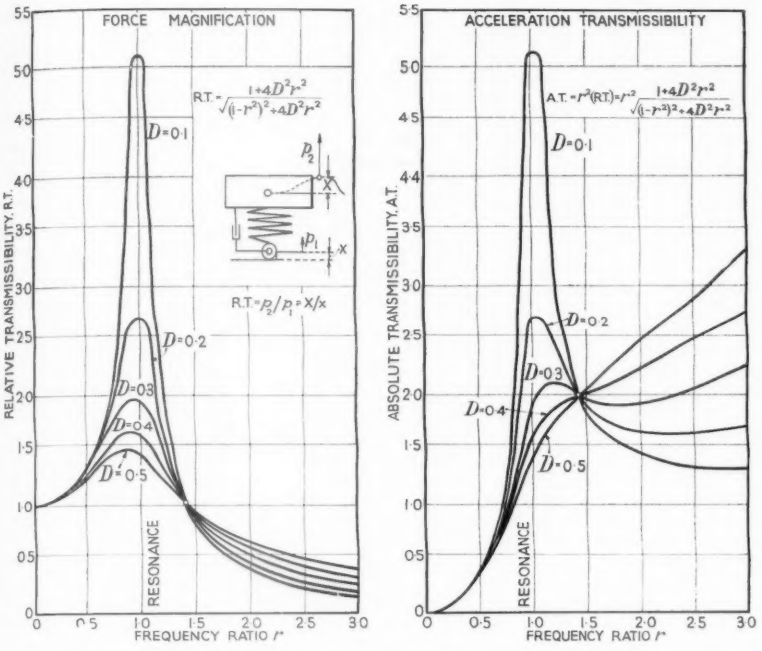
is the logarithmic decrement of the oscillation decay. Conversely, if δ is known,

$$D = \frac{\delta}{\sqrt{4\pi^2 + \delta^2}}$$

The effect of D on the pattern of oscillation decay is shown in Fig. 1, and it should be mentioned that, as far as riding qualities in the vertical plane are concerned, a value of 0·2 to 0·25 should be aimed at, while with body nosing these values should be increased to about 0·3 to 0·4.

The reason that this particular value possesses advantage will be gathered from the fact that within the frequency range mainly applicable here the human body is mostly affected by the acceleration resulting from the oscillations. These, apart from frequency (f), depend on the amplitudes (a) of the oscillations. The latter depend on the effective height of the obstacle, frequency ratio, and magnitude of damping, amplitude of displacement of the body being expressed in terms of relative magnification factor, while the magnitude of the transmitted force is given by the relative transmissibility (Fig. 2a). The acceleration, in terms of absolute transmissibility, is

* Reference is frequently made to shock absorbers. Suspension springs are provided to act as shock absorbers while hydraulic (viscous) or friction dampers are fitted to dampen oscillations and to reduce amplitude peaks—not to absorb shocks.



Figs. 2(a) and 2(b)—Effect of damping on the force and displacement transmissibility and resultant acceleration. Generally, a value D=0·2 to 0·25 should be aimed at for vertical oscillation. For lateral oscillation, D=0·3 to 0·4 is desirable

obtained by the former multiplied by the square of the frequency ratio (Fig. 2b). It will be noted from the curves (Fig. 2b) that the value of about D = 0·2 to 0·25 provides optimum performance as far as absolute transmissibility is concerned. On the face of it, even a small amount of damping is detrimental as long as the frequency ratio r > 1·41, because here damping acts as an amplifier, while its absence is equally undesirable as long as r < 1·41.

Nevertheless, vehicles must operate over a wide range of frequency ratios and a compromise accordingly must be achieved. D = 0·2 to 0·25 ensures good results as far as vertical oscillations are concerned. Higher values result in jerky action and induce high-frequency oscillations of the body structure.

Degrees of Freedom

These considerations apply to a system consisting of a spring-supported body and a hydraulic damper provided across the spring, i.e., a system with one degree of freedom (Fig. 2a). A bogie vehicle consisting (at one end) of a spring system with a total stiffness c_1 supporting the bogie mass m_1 incorporating a damping resistance p_1 and carrying in turn bolster springs with a total stiffness c_2 and a damping resistance p_2, and supporting the vehicle body with a total mass m_2, will be a system with two degrees of freedom whose pattern of oscillations is more complex (5). This will have two natural frequencies the higher of which will be effectively suppressed by a suitable damping force (3). The relative transmissibility of such a system can be approximately evaluated with the aid of a simplified expression :—

$$RT = \sqrt{\frac{1+4D_t^2r^2}{(1-r^2)^2+4D_t^2r^2}}$$

where $r = \omega / \omega_1$, ω is the forcing frequency and ω_1 is the lower natural frequency of a two degree of freedom system (4), while

$$D_t \approx \frac{p_t}{2(\eta_1 m_1 + m_2)\omega_1}$$

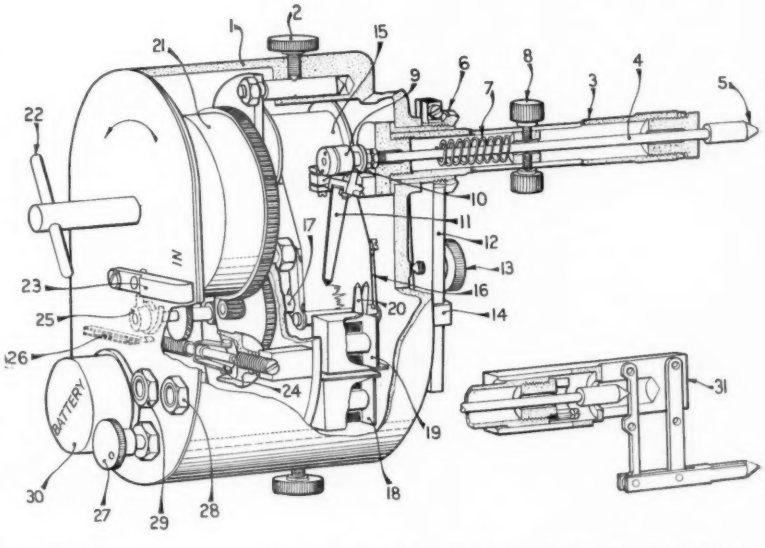
with $p_t \approx p_1\eta_1^2 + p_2\eta_2^2$

Here, $\eta_1 = d_1/d_t$ is the relative axlebox spring deflection, $\eta_2 = d_2/d_t$ is the relative bolster spring deflection, d_1 (in.) is the axlebox spring deflection, d_2 (in.) is the bolster spring deflection, $d_t = d_1 + d_2$ the total bogie spring deflection, and $\eta_1 + \eta_2 = 1$.

As the damping factor determines the pattern of oscillation decay, it follows that knowledge of the latter will help to determine the magnitude of the former and thus provide means of checking the consistency of damper action. But, while the value of D can be increased by the use of dampers, it is also very important to know the magnitude of damping "inbuilt" in the system, for this will provide basic data relating to amplitudes and sometimes to the overall pattern of suspension oscillations. This is particularly the case in the lateral plane where excessive friction forces can override swing link action.

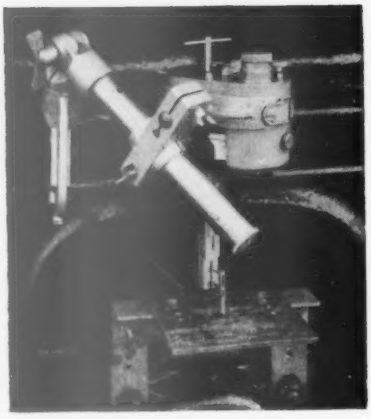
Interacting Effects

The interacting effect of the magnitudes of p, m, and c on D will be readily appreciated from reference to the first equation. According to this, for a given p the value of D will be reduced with increasing values of m and c. Because of the definition of p and D these considerations apply to viscous damping only, but the conditions frequently relating to railway rolling-stock permit the use of these relations also with friction damping, the action of which can



1 Housing
2 Holding screws
3 Feeler tube
4 Feeler rod
5 Feeler point
6 Knurled nut for clamping the feeler tube
7 Tension spring
8 Tension adjustment
9 Stylus connection
10 Stylus bearing
11 Stylus
12 Setting lever for feeler tube and stylus
13 Clamping screw
14 Latch with stop screw for item 12
15 Waxed paper tape
16 Desk
17 Driving roller
18 Time marker for optional marks
19 Time markers for second-marks
20 Levers for time marking
21 Spring drive
22 Winding key
23 Operating switch
24 Governor
25 Cam
26 Spring control
27 Electric switch
28 Two-pole socket I
29 Two-pole socket II
30 Torch cell
31 Reduction attachment

Fig. 3—Askania hand vibrograph



Hand vibrograph mounted for recording oscillations between bogie frame and axlebox

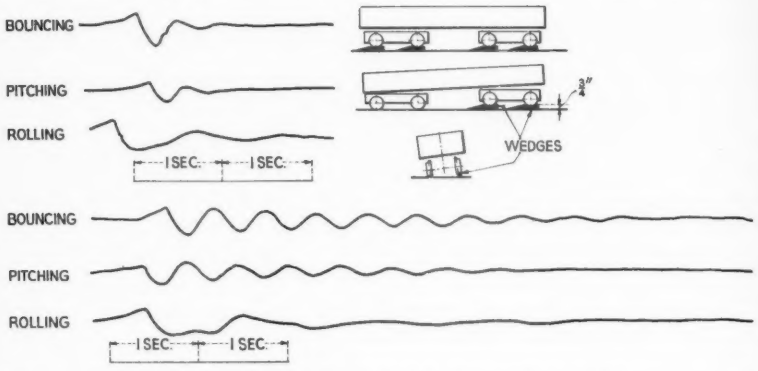


Fig. 4—Vibrograph records of diesel-electric locomotives. The upper record suggests adequate damping with an overall value of D=0·2 to 0·25. The lower indicates D of about 0·05. These records were obtained with the locomotives "coasting." Higher values must be expected when pulling or braking

be interpreted in terms of hydraulic damping either directly by reference to a generalised decay pattern Fig. 1 or by making use of a simple artifice (5).

The pattern of oscillation decay can be obtained by recording the motion of the system when acted on by a step function (6). This can be achieved by running the vehicle on test onto steel wedges, about 18 in. long × ¾ in. high, the upper part of the wedge being horizontal for about 6 in. to facilitate stopping and steady running-off. The records are taken with the aid of an Askania Hand Vibrograph (marketed by Shandon Scientific Co. Ltd.) suitably mounted between underframe and axlebox or any two parts under consideration.

This instrument is compact (10¼ in. × 6 in. × 3½ in.) and weighs about 4 lb. (Fig. 3). The housing 1, stylus 11, and operating feeler tube 3 form one main assembly, while the clockwork drive 21, battery housing 30, and event and time markers 18 and 19 comprise the other main assembly which can be separated from the housing by releasing the screws 2. The feeler tube 3 houses the feeler rod 4 which is pressed against the oscillating surface by the spring 7, the tension of which can be adjusted with the aid of the bracket and screws 8. The motion of the rod 4 is transmitted to the stylus 11 recording on waxed paper 15, usually with a 5: 1 magnification but, if 1: 1 records are required, use can be made of a 5: 1 reduction attachment 31. The stylus 11 can be brought in contact with the recording tape by rotating the tube 3 with the aid of lever 12 which can be locked in position by the screw 13. The spring drive 21 is wound up by the key 22 and drives the roller 17 which feeds the waxed paper 15, while the governor 24 is driven via a worm gear. By friction of centrifugal weights at an adjustable conical drum, the governor controls the paper advance at a fixed rate of about 1½ in. per sec., the tape feed being started and stopped by the switch lever 23. The duration of operation varies between a minimum of 1 sec. and a maximum of 2 min., which corresponds to the full wind-up of the driving spring.

The lever 23 can also be remotely controlled with the aid of an electromagnet secured to the housing. Two magnetic time markers are provided to record time and reference marks. The magnet of marker 19 receives impulses at one-second intervals from the torch battery 30 via the cam (25)-operated spring contact 26. The magnet can also be energised from an outside battery which can be connected to the sockets 28, the 1-second marks being recorded by the lever 20. If more accurate or frequent time marks are required these can be fed via 28 after setting switch 27. The time marker 18 can be connected to a switch and battery via sockets 29 and used as an event or reference marker, and this feature is of particular value when using several vibrographs simultaneously, as it permits lining up of records against a common reference mark. By adjusting the pressure of the spring 7 the instrument can be made to record frequencies of up to 250 cycles per sec.

Bouncing Oscillations

To determine the frequency of bouncing oscillations (2) wedges are placed under all wheels and the vehicle moved on these. In the case of carriages a winch can be used to pull the vehicle on the wedges, while locomotives can move on and off the wedges under their own power. To ensure that the vehicle does not run over successive wedges, these should be provided with string attachment facilitating rapid withdrawal once the vehicle moves off (Fig. 4). The natural frequency of body pitching is determined with the aid of wedges placed under the wheels of one bogie only. To check that the oscillations correspond with the mode envisaged by

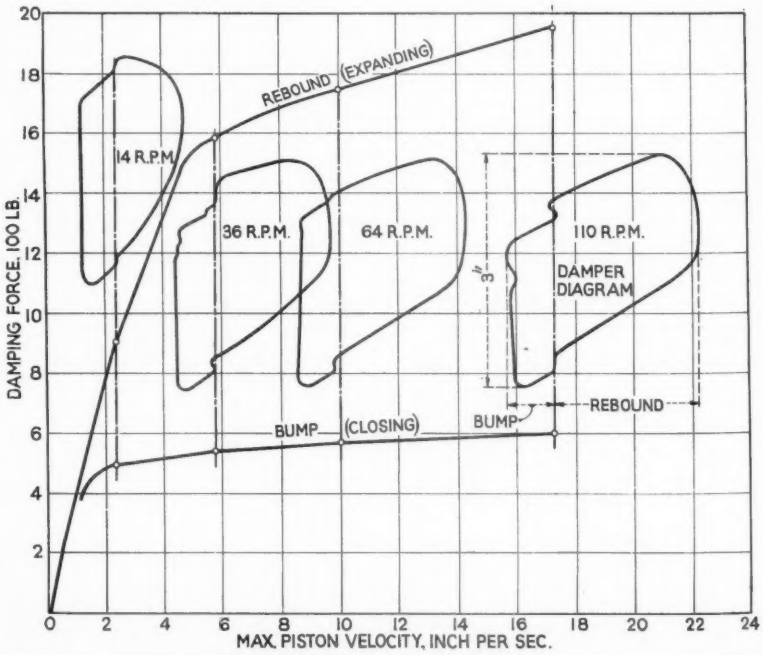


Fig. 5—Determination of damper characteristics from speed-force diagrams obtained with the aid of special test machines

the excitation, a vibrograph should be mounted between each bogie and the body. The time signal from one vibrograph can also be fed to the other and a common marking signal will further facilitate the lining-up of the two records and subsequent evaluation. The natural frequencies of the lateral motion can be excited by moving off wedges placed under all wheels on one side only. As the lateral motion usually comprises lateral oscillation on the swing links as well as angular rotation of the body on the springs, it will be desirable to separate these modes by using one vibrograph in the vertical and the other in the horizontal plane. To obtain representative values it is advisable to repeat each test at least three times.

Evaluation by Vibrograph

Typical vibrograph records are shown in Fig 4, and it will be noted that these enable ready evaluation in terms of frequency and oscillation decay, i.e., damping factor. With vehicles not incorporating additional dampers the latter was found to vary between about 0·05 and 0·25 for bouncing, pitching, and rolling oscillations alike. In service these values can be increased due to tractive effort forces increasing the friction forces at hornguides, etc. Because leaf springs are usually relatively heavily damped (D about 0·5), the overall oscillation pattern is in the main determined by the helical spring assemblies, and here the relevant p-values in conjunction with the relatively great masses and stiff springs result in low damping factor magnitudes. As a first approximation the "inbuilt" damping factor is of the order of 0·1 to 0·15, dampers being required to bring it up to 0·2 to 0·25. On the other hand "inbuilt" values with modern bogie locomotives can be as low as 0·05 and as high as 0·25, the latter value referring to a unit incorporating helical springs and horn guides.

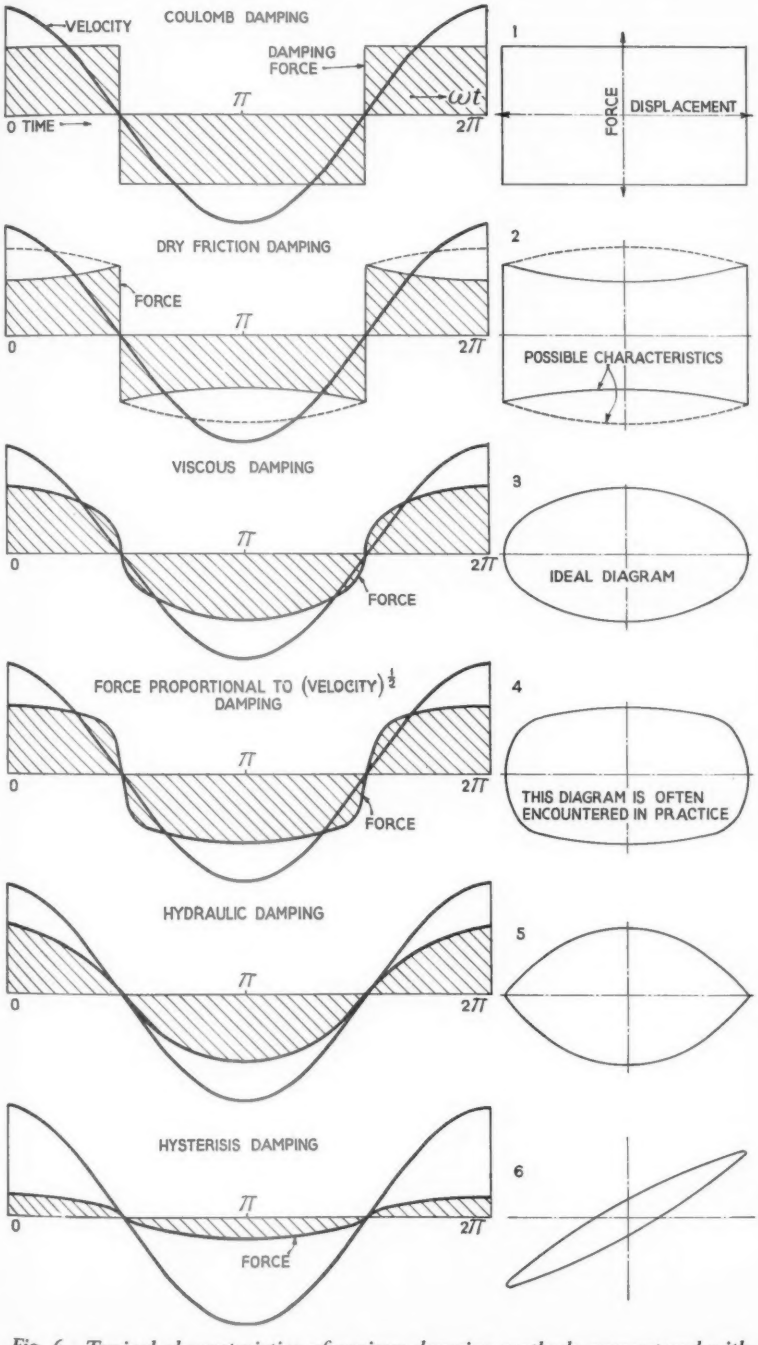


Fig. 6—Typical characteristics of various damping methods encountered with railway vehicles

Wedge tests can be effectively used to ensure necessary "tuning" before embarking on full-scale road tests. To obtain valuable fundamental data it is considered that, to begin with, damping properties should be ascertained both without and with the dampers fitted. The method outlined here is also suitable to determine damping consistency of vehicles as a function of mileage. The results obtained with some vehicles not using additional dampers indicate that these can vary by ± 50 per cent with mileage. In this way it is also possible to check the reliability of the damper performance under service conditions.

Damper performance is generally determined with the aid of rig-recorded indicator diagrams (Fig. 5), the maximum force being plotted as a function of the maximum linear piston velocity. The curves (Fig. 5) rise at first rapidly and then more slowly as soon as the unloading valve comes into operation. With many typical dampers the force in the rebound part of the characteristic is proportional to the 0·8 to 1·1 power of piston velocity at speeds of up to about 8 in. per sec. Characteristics of individual damper types can be altered within fairly wide limits by alterations to valve setting and the number and size of bleed passages.

Force-Displacement

It should be mentioned that the method of damper performance plotting indicated in Fig. 5 does not allow for the finer points of the force-displacement diagram. The shape of these diagrams as obtained with hydraulic dampers can vary fairly widely within the limits indicated by the loops 3 to 5 of Fig. 6 but, as the curves of Fig. 5 are based on maximum values only, these differences will not become apparent. This is one of the reasons why the action of dampers nominally possessing identical characteristics (along lines plotted in Fig. 5) will differ in service.

Bump and Rebound

Much has been said regarding damper characteristics in bump and rebound and various types are used at present. Thus, with some the bump forces mainly result from friction and often are practically unavoidable, the damping

acting effectively in rebound only. Theoretically, it can be shown that single-acting (rebound) dampers will reduce body displacement resulting from obstacles to a greater extent than would be the case with double-acting units. The upward acceleration will also be smaller, but the downward one will be slightly increased and with it the force imposed by the wheels on the rails. With road vehicles the bump/rebound damper forces are usually set to ensure a ratio of 1/2: 1/4 mainly to maintain good road holding, while with rail vehicles dampers are used in the first instance to dampen oscillations (Fig. 2a), so that here a 1:1 ratio would appear to be generally called for. It is possible that unsymmetrical damper characteristics may be of some benefit as far as body rolling and nosing oscillations are concerned.

Determination of Parameters

The determination of damper parameters is in the following considered for the case of a railcar trailer. The half-elliptic primary springs are so heavily damped that they do not affect the overall pattern of oscillations. Consequently, only the action of the helical bolster springs will be considered. The 56-ft.-long body weighs 14·7 ton, bogie centres being 40 ft. apart, while the static bolster spring deflectioned under tare load is 2·67 in. The moment of inertia of the body about the lateral axis through the centre of gravity (pitching) is obtained (5) from:

$$I_y = mr^2 = \frac{W}{g}(0{\cdot}32L)^2 \text{ (ft. lb. sec.}^2\text{)}$$

where r (ft) is the radius of gyration, W (lb.) the weight and L (ft.) the vehicle length over headstocks. The relevant data is summarised below where f_1 (cycles per sec.) is the natural frequency of bouncing and f_2 (cycles per sec.) the natural frequency of pitching. The values the critical damping (D = 1) will be:—

$$D = 2\sqrt{1020 \times 148{,}000} = 24{,}500$$

(lb. sec. per ft.), while for 0·15D expected of the dampers the relevant value will be 3,670 lb. sec. per ft. As a total of four dampers (two per bolster) will be used, each will be required to provide p = 920 lb. sec. per ft. The natural frequency of the damped system will be $f^1 = f\sqrt{1 - D^2}$, where f is the frequency unaffected by damping. The mean displacement velocity is determined from the original displacement (0·65 in.) followed by the oscillation decaying after about 2½ cycles (D = 0·25). The rate of decay is determined by the magnitude of the logarithmic decrement δ. Here

$$\delta = \frac{2\pi D}{\sqrt{1 - D^2}} = \frac{6{\cdot}28 \times 0{\cdot}25}{\sqrt{1 - 0{\cdot}25^2}} = 1{\cdot}625$$

The amplitude at the end of every half cycle is determined as shown in the following table, calculations being based on the fact that with viscous damping

$$X_{m+1}/X_m = e^{-\delta}$$

where X is the amplitude of the oscillation.

Cycle	X_{m+1}/X_m	Amplitude (in.)
½	$e^{-0{\cdot}813} = 0{\cdot}443$	0·282
1	$e^{-1{\cdot}625} = 0{\cdot}195$	0·127
1½	$e^{-2{\cdot}44} = 0{\cdot}088$	0·0572
2	$e^{-3{\cdot}25} = 0{\cdot}039$	0·0254
2½	$e^{-4{\cdot}07} = 0{\cdot}0107$	0·007

Total displacement during the 2½ cycles will thus be:

0·65 + 2 × 0·282 + 2 × 0·127 + 2 × 0·572 + 2 × 0·0254 + 0·007 = 1·64 in.

accomplished in 1·35 sec., mean displacement velocity being 1·215 in. per sec. Consequently, the damper should provide a force of 920 × 1·215/12 = 93 lb. Maximum displacement velocity is 4·8 in. per sec.

As pitching is even more important than pure bouncing, it will be more advisable to consider dampers in conjunction with this mode of oscillation. Here,

$$D = \frac{p^1}{2I_y\omega} = \frac{p^1}{2I_y 2\pi f_2}$$

where—because of the nature of the oscillations $-p^1 = pa^2$, where a (ft.) is half the distance between bogie centres. Conversely,

$$p = 4\pi D I_y \delta f_2^1/a^2$$

For D = 0·15 to be provided by four dampers, the total value of damping resistance will be:

p = 4 × 3·14 × 0·15 × 320,000 × 2·08/20² = 3,200 (lb. sec. per ft.)

or p = 800 (lb. sec. per ft.) for each of the four dampers. Assuming the same displacement as before, i.e., 1·64 in. to standstill, the time required for the 2½ cycles will be 2·5/2·08 = 1·2 sec. and mean displacement velocity 1·64/1·2 = 1·365 in. per sec. Consequently, required damper force is 900 × 1·365/12 = 102·5 lb. Thus, the required damper characteristic is determined in terms of force and piston velocity and the requirements can be communicated to damper manufacturers. The force here is related to mean speed and these considerations apply to springs with conventional straight line force-displacement characteristics. Conditions become more complex with springs having non-linear characteristics (5) and also with vehicles having unequally distributed masses and using springs with different stiffness values at the front and rear bogies.

Load (tons)	d (in.)	f_1 (c/s)	I_y (lb.ft.sec.²)	f_2 (c/s)	d^1 (in.)	D	f_1^1 (c/s)	f_2^1 (c/s)
Tare 14·7	2·67	1·91	320,000	2·16	0·65	0·25	1·84	2·08
½ load 16·95	3·08	1·78	369,000	2·02	0·70	0·233	1·72	1·96
Normal 19·2	3·49	1·67	418,000	1·90	0·75	0·219	1·63	1·85

constant value of 0·32 applies for coaches and railcar trailers. It is about 0·28 for railcars with underfloor engines and 0·22 to 0·25 for diesel and electric locomotives.

Railcar Data

The determination of the values of f_1 and f_2 are dealt with in Ref. (5), while the dynamic spring deflection $\pm d^1$ (in.) is obtained from the curves of Fig. 3 (ref. 1).

It is assumed that, with the conventional bogie considered here, the "inbuilt" damping is equivalent to about D = 0·1, so that the hydraulic dampers should provide an additional value of D=0·15, both values referring to the tare load. The spring stiffness of the bolster springs of both bogies is c = (14·7/2·67) × 2240 × 12 = 148,000 lb. per ft., while the mass of the body is m = 14·7 × 2240/32·2 = 1020 lb. sec.² per ft. With these

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PROPOSED ROADWAY UNDER BLACKFRIARS STATION, S.R.—A scheme for a relief road in the City of London provides for an underpass beneath the north ends of Blackfriars Bridge (road) and Blackfriars railway bridge, British Railways, Southern Region. The railway bridge at this point carries the line from Herne Hill to the L.T.E. Metropolitan Line at Smithfield, and to Holborn Viaduct, and the through and terminal plattorms and tracks in Blackfriars Station.

INCREASED STEEL PRODUCTION.—Reports from almost all sections of the steel industry show that orders are increasing and that delivery dates for most products are tending to lengthen. The output for September was the highest since February last year. This revival means that the industry is now generally back to about 90 per cent of capacity. An increase in exports is one reason. Last month's output of crude steel averaged 426,400 tons a week, which is almost 16 per cent more than a year ago and comes within 3 per cent of the average for September, 1957, the highest September ever recorded.

BRITISH TRANSPORT DOCKS IMPROVEMENTS AT HULL.—The British Transport Commission has authorised a £4,750,000 scheme of improvements at King George Dock, Hull, including extension of three quays and the provision of additional transit sheds, cranes, grain elevators, and silo accommodation. The main expenditure will be on the north side, where No. 1 Quay will be extended to provide simultaneous berthing for six of the largest ships using the dock. Railway facilities are to be improved on several quays. King George Dock, built jointly by the former North Eastern and Hull & Barnsley Railway Companies and opened in 1914, can admit on all tides vessels drawing up to about 27 ft., but some cargo ships do not have free access because of their greater draft. The Commission has called for a hydrographic survey of the dock entrance with a view to measures to enable larger vessels to enter or leave on all tides.

Railway Development in Portugal

Progress with electrification at 25-kV., 50 cycles

(*By a correspondent*)

CONSIDERABLE sums have been allocated to railway modernisation and re-equipment under the terms of the Portuguese Second Development Plan, 1959-64, and work in many sectors is proceeding apace.

Electrification is to play an important part in the general scheme, with the conversion of the main Northern Line between Entroncamento and Oporto, as well as short sections radiating from the latter city, and involving a total of 241 route-km. (150 route-miles).

In April, 1957, the new electrified service between Lisbon Rossio and Sintra was inaugurated, followed two months later by the first stage of the Northern Line electrification as far as Vila Franca de Xira. On June 30, 1958, electric trains started to run between Santa Apolonia terminus and Entroncamento (66 miles), and already the overhead equipment has been extended to just beyond Pombal, or roughly half way to Oporto.

The results achieved on the Sintra line alone provide a foretaste of the success that is likely to accompany the introduction of improved services elsewhere. For example, comparing the first 12 months of electric with the last 12 months of steam operation, sales of tickets, including seasons, increased by 46·2 per cent and total receipts by 38·7 per cent.

System of Electrification

Electrification was originally planned on the 3,000-V. d.c. system, but nothing was done until 1953, when the First Development Plan took shape. As a result of the successful French experiments with 25-kV. a.c. at 50 cycles the matter was reviewed and it was decided that such a form of traction was practicable.

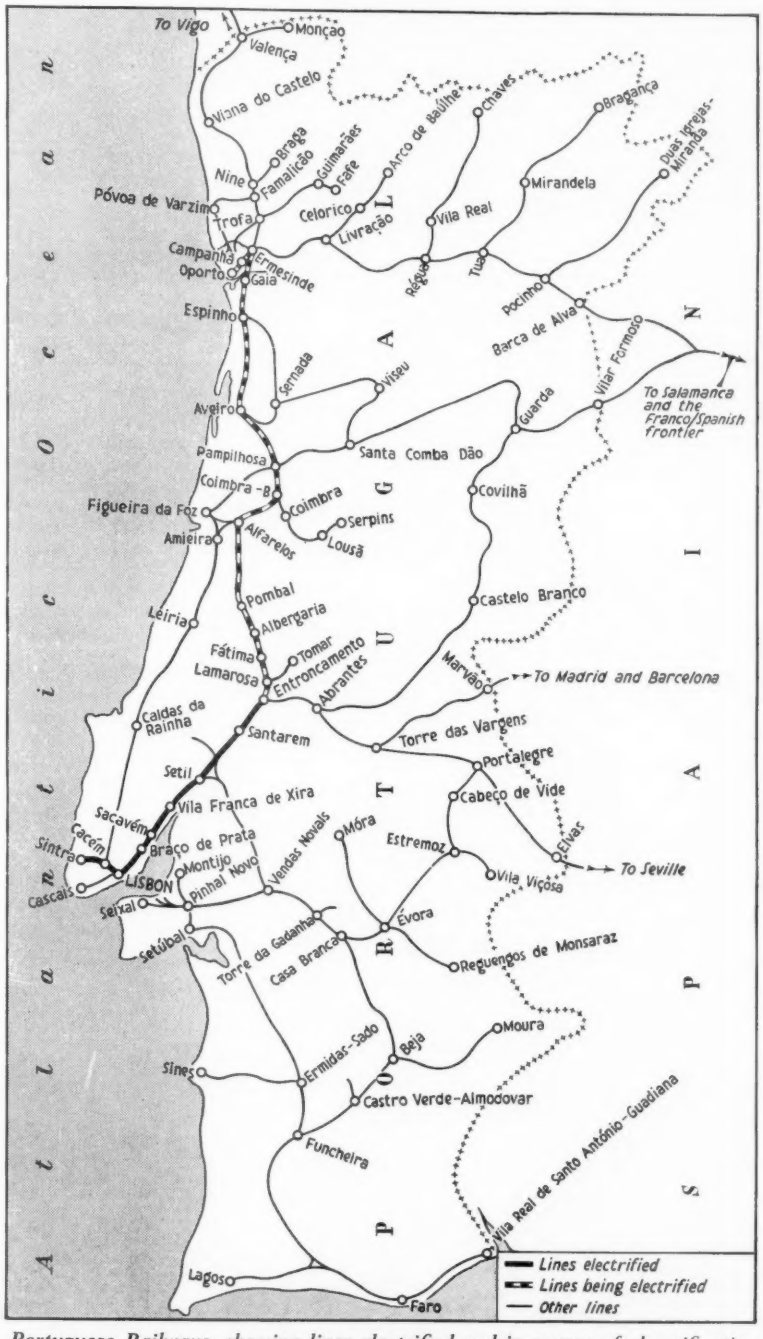
One considerable advantage lay in the fact that the local electricity authorities' transmission lines were situated very close and in many cases parallel to the railway, thus avoiding heavy expenses in providing feeder lines to the sub-stations.

All telegraph and telephone lines which ran parallel to the railway had to be enclosed in cable to prevent inductive interference, and considerable lowering of track in tunnels and similar structures was essential to give adequate clearance for the overhead equipment. The most extensive work of this nature was carried out in the Rossio tunnel, about 1½ miles long, involving an average lowering of 1 ft. 6 in. to 2 ft. and the construction of a reinforced concrete lining for some 765 yd.

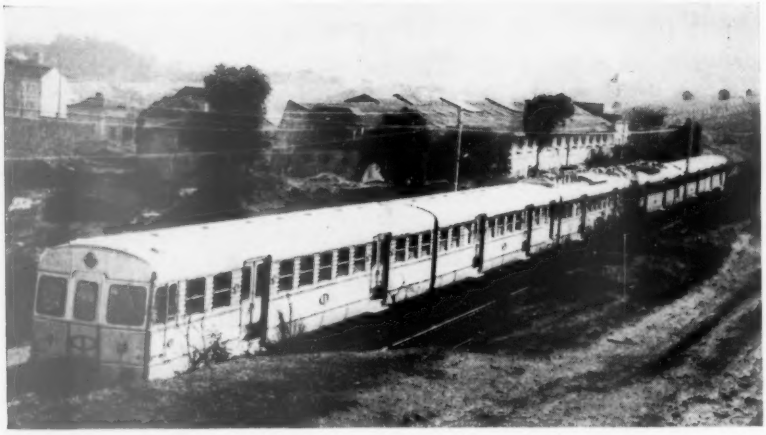
Locomotives and Rolling Stock

For the first phase of electrification 15 Bo-Bo locomotives were ordered; these weighed 70 tons and developed 2,500 h.p. continuously at 65 m.p.h., with a momentary maximum of 2,700 h.p. (at 62 m.p.h.). To enable these units to haul not only high-speed passenger trains, for which a maximum of 74.5 m.p.h. has been prescribed, but also heavy slow-moving freight trains, rectification on the ignitron principle was adopted for supplying the four traction motors with direct current.

For the suburban and outer suburban traffic emanating from Lisbon multiple-unit trains consisting of stainless steel vehicles of Budd design were ordered. Each unit comprises a motor coach, trailer, and driving trailer, and is rated at 1,360 h.p. continuously (1,500 h.p.



Portuguese Railways, showing lines electrified and in course of electrification



Multiple-unit electric train in Lisbon suburban area

momentarily) at 63 m.p.h.; at peak periods trains are made up into composite units of six or nine vehicles. Special features include central automatic Scharfenberg type couplings; compressed air-brakes and rheostatic braking; fluorescent lighting, electric heating, and sliding automatic doors. Painting has been eliminated as far as possible, plastic materials, washable and in bright colours, being used for the interior of the coaches. The coaches have two wide doors on each side, and a three-coach multiple-unit set has 116 first class and 384 second class seats.

Considerable improvements in timings were made possible by electrification. For example, typical schedules between Lisbon and Sintra and between Lisbon and Vila Franca de Xira in both directions are now 30 and 40 min., respectively, representing reductions of some 40 per cent in each case. Because the former timings allow for 12 and the latter for 17 stops and many of the stations are closely spaced, full advantage has been taken of the accelerative and decelerative properties of the new units.

In the realms of diesel traction, there is to be a progressive introduction of locomotives ranging from 800 to 1,600 h.p. to serve the broad-gauge lines in the Douro and Minho provinces; these will be supplemented by multiple-unit sets besides single railcars, allocated for both the former and the narrow-gauge lines of the Vale do Vouga and the Vale do Corgo.

Civil Engineering Works

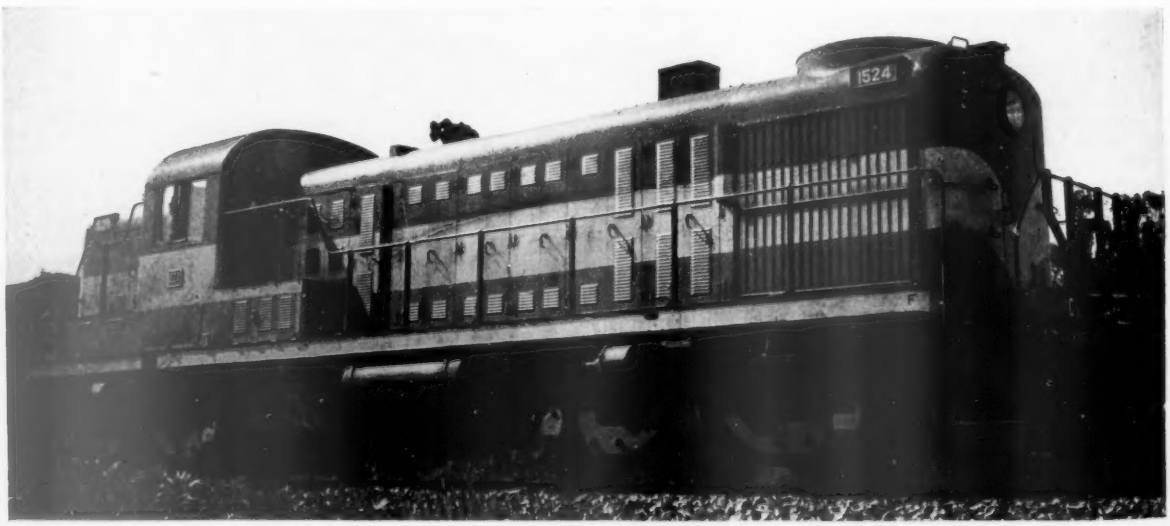
Carriage and wagon stock is to be completely overhauled, the first step to include the acquisition of 20 new passenger vehicles for main-line services, together with 350 broad- and 60 narrow-gauge freight vehicles of varying types.

To increase line capacity and provide better facilities for through running, a number of improvements are envisaged. On the Northern Line, for example, this includes the doubling of the 12·2 miles of single track between Fátima & Albergaria and of the line traversing M. Eiffel's bridge over the Douro between Vila Nova de Gaia and Campanhã; the latter scheme confronts the authorities with an acute problem, but it is understood that the framework of the new Arrábida road bridge in Oporto, now under construction, can be easily and inexpensively adapted to provide the second arch for the railway structure. Elsewhere, it is proposed to construct a cut-off for through traffic near Beja and a spur linking the Northern with the Western main line. The latter leaves the Sintra line at Cacém and serving centres such as Caldas da Rainha and Figueira da Foz. The new line will pass close to the shrine of Our Lady of Fátima, the venue of many national and international pilgrimages.

Permanent way and other civil engineering work of importance involves the relaying of about 190 miles of broad-gauge and 65 miles of narrow-gauge track, and reinforcement of 76 bridges, 58 of which are situated in the Beira Baixa and 18 in the Douro area. The extension and modification of actual layouts at a number of stations and yards, having in view the heavier and longer compositions that can be handled by the most recent traction units, is another essential task. No less so is the comprehensive modernisation of locomotive and carriage depots and concomitant workshops, to cater for the new electric and diesel stock and to provide the most efficient and economical facilities for maintenance, repairs, refuelling, and so on.

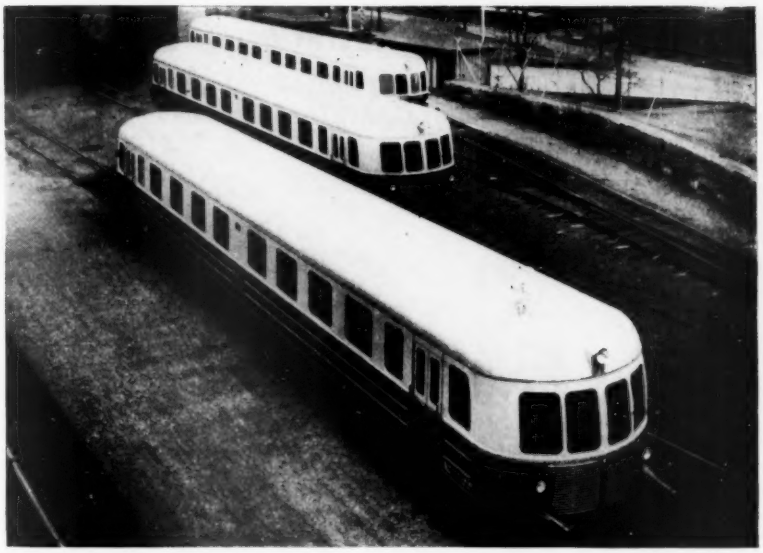
Finally, as a logical consequence of the greater volume of traffic and higher speeds contemplated, a complete overhauling of the signalling and telecommunication methods has been accorded a special priority on all lines where there is intense movement. In this connection, by the end of 1958, modern block equipment, including colour-light signalling, had been installed on the Sintra line and over a considerable stretch of the Northern Line.

Faced with these extensive new works, the authorities of the Companhia dos Caminhos de Ferro Portugueses can



Alco A1A-A1A 1,820-h.p. diesel-electric locomotive, with maximum speed of 75 m.p.h.

at least take courage from the fact that economies resulting from the early stages of modernisation have already been on a not inconsiderable scale. They are also confident that heavy capital outlay on the renewal and maintenance of existing track and installations and on the building of new lines which would be far heavier were such tasks to be deferred will be defrayed, within a reasonable period, by the additional economies accruing from the later stages.



Nohab railcar. Series 101-115, used for feeder services. Equipped with two 150-h.p. Scania-Vabis engines, these cars have a top speed of 62 m.p.h. and accommodate 96 passengers

Comparative Draughting Trials in Spain

Experimental application of Giesl ejector and superheat booster in runs over steeply-graded track

DYNAMOMETER car test runs of two Spanish National Railways 2-8-2 locomotives, one of which was fitted with the Giesl ejector and superheat booster, the other with the standard single Kylchap front-end, took place recently on steeply-graded track between Madrid and Ciudad Real. Successful results are reported for the ejector-fitted locomotive using poor-grade fuel; these include the comparative data in the accompanying table.

	Locomotive		Difference in result (with ejector)
	141.2220 (Kylchap)	141.2211 (Ejector)	
Number of intermediate stops	35	33	—
Net running time (min.)	491	429·5	61·5 min. less
Average running speed (m.p.h.)	26·6	30·4	14 per cent higher
Train weight (long tons):			
Madrid—Algodor, 38 miles	422	411	
Algodor—C. Real, 71 miles	346	336	
C. Real—Algodor, 71 miles	336	411	
Algodor—Madrid, 38 miles	387	463	
Total ton-miles	80,100	84,400	5 per cent extra
Ton-miles per hour	9,800	11,800	20 per cent higher
Coal consumption (long tons)	6.5	4.7	27 per cent less
Detail of hill section, Algodor—Almonacid, 12·5 miles			
Net running time, min.	49	35	28 per cent less
Average running speed (m.p.h.)	15.3	21.3	39 per cent higher
Weight of trains (long tons)	422	411	2·6 per cent less
Ton-miles per hr. (work done)	6,440	8,700	35 per cent higher

Both locomotives are of North British design built by Maquinista, nine months out of shops and in similar condition, the ejector-fitted one having run 2,000 miles more than the other. A distance of 218 miles was covered in each case by making the return run Madrid–Ciudad Real–Madrid. Both terminals are at the same altitude, but there are long gradients of 1 in 67 (1·5 per cent) up to eight miles long in both directions.

From the table it will be observed that the extra 8–10 per cent capacity given by the Giesl equipment was of critical importance on the heavy gradients. There the ability to maintain or improve smokebox vacuum with, simultaneously, a reduction in back-pressure, enabled the locomotive to climb at 70 per cent of its net average running speed for the whole test and with almost smokeless combustion, although the coal used was bad with 60 per cent smalls. The load was 411 long tons. In comparison, the Kylchap locomotive, hauling 422 tons on similar fuel but 50 per cent smalls, was overloaded to the extent of losing pressure and having to complete the climb at slow speed making heavy smoke.

Fuel Economy

Quite the most outstanding characteristic of the results reported is the comparative fuel consumption—27 per cent better by weight for the ejector-fitted locomotive in spite of its 14 per cent higher net average running speed throughout the test.

The Giesl ejector, described in our March 20 issue, consists of a set of seven exhaust nozzles located along the smokebox centre-line surmounted by a fan-like arrangement of individual ejector cones and chokes terminating in an oblong-shaped chimney of normal height. The multiplicity of blast-pipes is necessary because a single true ejector of sufficient bore to disperse the large mass of steam and gas would be of such length that it could not be mounted conveniently within the loading gauge.

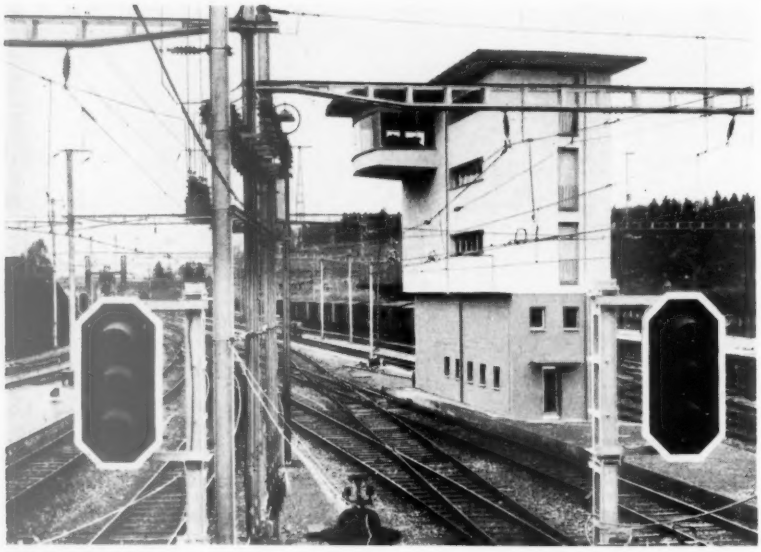
Draught Diverted

The achievement of improved draughting enables the superheat booster—a single baffle plate and individual caps which throttle the tubes below the bottom superheater flue—to divert a higher proportion of gas through the superheater flue, so making it possible for the superheat temperature to be raised by more than 100° F.

"LEAD—THE ENDURING METAL."—The première of a sound and colour film, "Lead—the Enduring Metal," took place at the Royal Society of Arts, London, on October 26. The film, which runs for 28 min., has been produced by the Lead Development Association to supplement its technical services. The main sequences demonstrate applications for lead which include sheet and pipe for building, paints, grids and oxides for storage batteries, solder, and electric cable sheaths. The enduring properties of lead and its value in shielding for industrial work involving radiation are also explained. Copies in 16 mm. are available on loan free of charge from the Lead Development Association, 18, Adam Street, London, W.C.2.

Power Signalling Installation at Spiez, Lötschberg Railway

Relay interlocking in place of power frames in use since 1914, to improve facilities for shunting and other movements



Relay interlocking signalbox, showing operating room projecting from main structure and platform starting signals

THE Berne-Lötschberg-Simplon Railway, a major privately owned undertaking in Switzerland, came into existence when most of the main lines in that country were being taken over by the Confederation. Its importance may be gauged from the fact that the Canton of Berne actively supported its construction and came to hold a considerable share of its capital. Other lines came to be associated with the original portion, running from Berne to Neuchâtel and Thun via Gürbetal, from Thun to Spiez and from Spiez to Zweisimmen, making an extensive network. One consequence is that the Canton of Berne is the only one in the country to have its own Ministry of Railways.

In 1913, the main route from Spiez to Brigue, at the western end of the Simplon Tunnel, was opened and what was, for its time, an up-to-date electro-pneumatic power signalling installation was obtained for Spiez station from the then well-known Maschinenfabrik Bruchsal, in Baden, Germany.

This was brought into use in 1914. The signal and point mechanisms were of the diaphragm type and low-pressure air was used. The equipment included a supervisor's lever frame in the station building, controlling by means of d.c. electric locking mechanism, others in three separate signalboxes, as often seen on the Continent, with interlocking block to the adjacent stations operated by magneto-generator, also well-known in Central Europe.

The installation remained for some time the only power operated one in Switzerland. It was also the only electro-pneumatic one ever seen there. All later work was purely electric. The Lötschberg line, however, to obtain more reliable operation in wintry weather, gradually applied electric solenoid mechanisms to its mechanical type signals.

This Bruchsal type equipment rendered good service for 45 years but was replaced in June, 1959, by a relay interlocking, with electric point machines, colour-light running signals and other improvements.

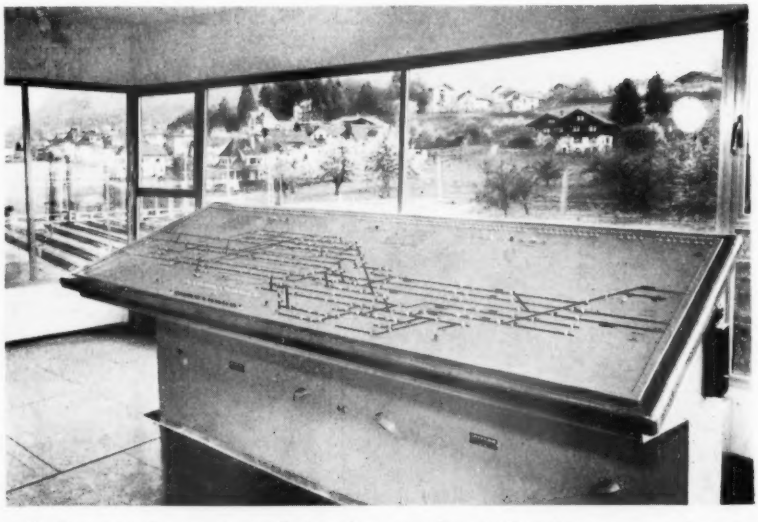
Spiez is an important junction, being connected not only with Thun, Brigue, and Interlaken, but through the branch to Zweisimmen with the metre-gauge Montreux - Bernese - Oberland (M.O.B.) line. Only the route fron Thun is double track. An average of 310 trains are dealt with daily; on occasion the figure can be as high as 400. Of these some 20 contain through coaches in international services to and from France, Germany, Italy and beyond via Delle, Basle, and Domodossola. Such coaches run also to and from Interlaken. The working includes some 30-40 goods trains daily, which form an important part of the north-south transit traffic through Switzerland. There are also each day some 3,500 shunt movements and for this reason it was decided to enlarge and re-arrange the track layout to give greatly improved facilities.

Signalling Arrangements

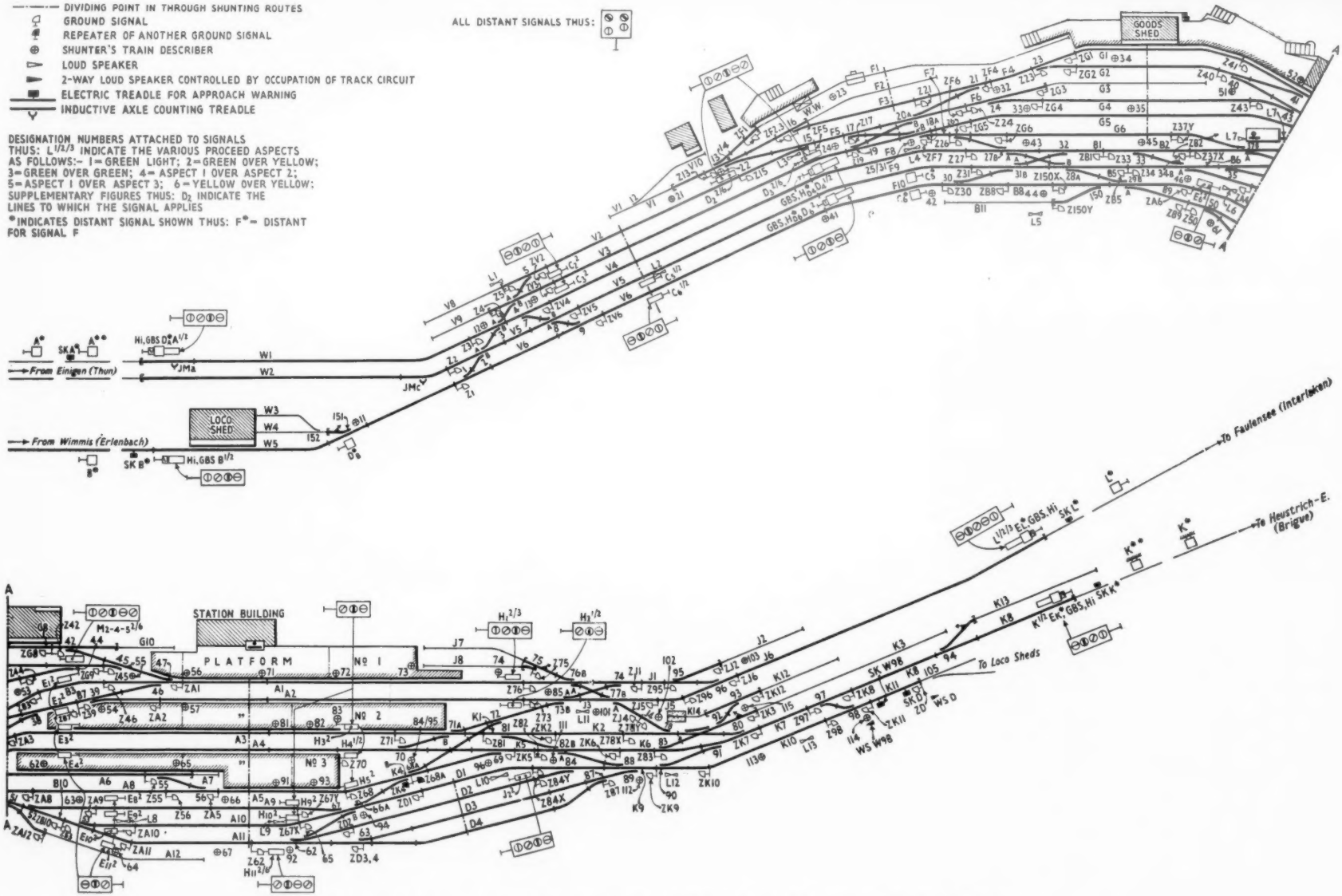
There are 108 electric trailable point machines. All points have trailable locks, as is usual in Switzerland, with additional detection of the tongues on those used by running movements. There are 31 home and starting and 13 distant sginals; some of the latter are carried under home signals.

The layout is divided into three main sections: the passenger station, the goods station, and the approach area on the western side. This last is delimited by the inner home and second starting signals and forms a berthing section into which trains from Thun and Zweisimmen can be brought so as to clear the block section in rear. Similarly outgoing trains can move forward, if necessary, to clear the station area and wait until the section ahead becomes clear.

The running signals exhibit aspects standard for some time on all Swiss lines with the addition of one applied here for the first time, namely, two yellow lights



Desk panel for control of shunting movement. Running movements are controlled from panel in the station supervisor's office



Layout of new power signalling installation at Spiez, Berne-Lötschberg-Simplon Railway

arranged vertically and signifying "next signal is at danger at short braking distance; draw forward cautiously."

The home signals have a " calling on " sign formed of a horizontal row of yellow lights shown under the ordinary " proceed " aspect when the track ahead is occupied. When this is exhibited the distant signal in rear remains at " caution." A diagonal row of yellow lights under a running signal gives permission to a driver to draw forward cautiously past a red indication, when for some reason a home signal cannot be cleared. Home signals and such other stop signals as require to be read from an appreciable distance as, for example, the second starting signals C5 and C6, have a reserve red lens unit which becomes switched in should the regular one fail. In other cases, such as starting signals E8, E9, E10, E11, the red units have out-of-focus standby bulbs, which light up if the focus bulb in front of them fails.

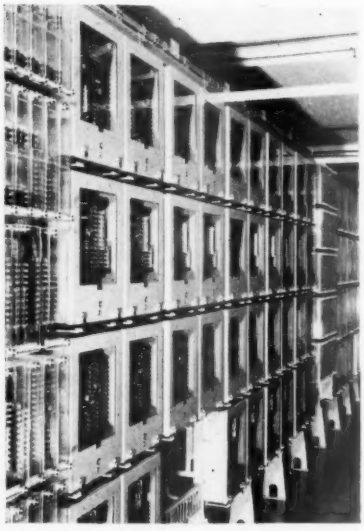
The 114 ground shunt signals are of the three-aspect position-light type, now standard for all new work, and found greatly to accelerate shunting operations.

Except in certain sidings used for stabling stock the entire layout is track-circuited in 148 single-rail d.c. sections, as the line is electrified on the 15,000 V. a.c. 16⅔ cycles system, the Swiss main-line standard. Near the outer distant signals are " Silec " type directly actuated treadle-contacts, to notify the approach of trains to the supervisor's control room.

Indoor Equipment

There are two " domino " type track diagram panels, one in the supervisor's room and 8 ft. 10 in. long, with which he regulates the running movements, the other, 7 ft. 10 in. long, in a new signalbox between the passenger and goods stations; this latter controls shunting movements only. The working differs slightly from that hitherto seen in installations of this kind in that the supervisor himself sets up the routes for running movements directly and does not merely issue an order for that to be done by the man in the dependent signalbox. The shunting is normally regulated by the signalman there on his own responsibility, but during quiet periods the box can be closed and such shunting as has to be carried out be dealt with from the supervisor's panel, which is equipped to manage the entire working when required. Either panel is easily operable by one man.

This arrangement relieves the supervisor of unnecessary work at busy periods and economises in staff when traffic is light. The supervisor communicates with the signalman by two-way loudspeakers and also ordinary telephone equipment. The circuits are so arranged that pressing a button relating to a particular section of the layout on one panel renders all those on the other relating also thereto inoperative; therefore no irregular route setting or other action can result from such simultaneous actuation of buttons. All movements require two buttons to be actuated together on the same panel to set and signal them. There are 313 distinct routes; running movements can be formed of several of these.



Interior of relay room, showing unit type plug-in relay sets and terminals

Full sectional release locking is provided. Where more than one path is possible between two points the most direct one will ordinarily become set up, but the supervisor has a power of selection in such cases. Shunting routes are confined within certain defined limits and when a movement has to go beyond them its path is formed of two or more, as occasion requires.

The relays, arranged on the " domino " and " geographical " circuit principle, number about 4,500 and carry some 32,000 contacts; 80 per cent are contained in standardised plug-in groups, of which four forms only are necessary. The 69 relay supporting frames were delivered completely pre-wired. This equipment occupies two floors in the signalbox. Interlocking block, on the Integra R.A.B. system, has been installed on all lines, with track circuit control, except on the line from Thun, where such apparatus, but controlled by axle-counting, already was in service; this has been retained.

Communication between shunting staff and signalbox is effected by describers supplied by Gfeller A.G. of Berne. At selected locations throughout the layout transmitting apparatus is provided; when a request for a route is sent to the signalman it does not at once become visually indicated to him; an automatic " repeat back " verbal reply is given on a loud speaker from a tape mechanism, so that the shunter, if he has asked for the wrong route has a chance to correct matters. This equipment also allows of two-way verbal communication between the men concerned.

The two-way loud speakers, shown adjacent to the siding line section K.11, between ground signals Z98-Zk.11 and Zd, enable a driver to speak directly from his cab to the signalman and, having announced his identity, receive instructions. The apparatus is brought into circuit by the occupation of the track circuit and was adopted for this location in preference to an ordinary train describer set, as the driver need not descend from the footplate.

As is customary in Switzerland power is taken normally from the 15,000-V. 16⅔-cycle traction supply; should this fail, however, a changeover is effected automatically in 1/10 sec. to the local 50-cycles public supply. Control and track circuit supplies are furnished by trickle charged accumulators.

The electro-pneumatic point movements were replaced by new electric machines and operated temporarily from the existing power frames; this enabled the final changeover to be effected in a few hours.

The installation was designed and supplied to the requirements of the former Chief Engineer to the Lötschberg System, Mr. von Fellenberg, and carried to completion under the direction of his successor, Mr. Isler, whose department worked in co-operation with the manufacturers, Integra A.G., Wallisellen.

Supervisor's rotary handle control frame installed in 1914 in connection with electro-pneumatic signalling. Similar frames were used in the signalboxes

RAILWAY NEWS SECTION

PERSONAL

Mr. J. P. Koster, Director General of the Netherlands Railways, has been appointed President, Research & Experiments, International Union of Railways (U.I.C.). He succeeds Mr. F. Q. den Hollander.

Mr. Henry E. Thompson, M.I.C.E., Chief Engineer, South Indian Railway from 1943 to 1947, whose death was briefly recorded in our October 23 issue, was 66. Mr. Thompson was articled to Messrs. Thropp & Harding, Chartered Civil Engineers, Lincoln, in 1910, and joined the Great Eastern Railway, District Engineer's Office, Stratford, in 1914. Later that year he served with the 20th London Regiment in France, and after his recovery from wounds, in 1916, served with the Military Engineering Staff, Southern Command, until 1919. He was elected A.M.I.C.E. in that year and joined the South Indian Railway holding successively the following appointments: Resident Engineer (Bridges), and Officiating Bridge Engineer, 1921-27; District Engineer, Podanur, 1928-32; Bridge Engineer, 1932-33; District Engineer, Cannanore, 1933-36; Personal Assistant to the Chief Engineer, 1936-37; District Engineer, Trichinopoly, 1938-39; Deputy General Manager, 1939-41; and Officiating Chief Engineer, 1941-42. Mr. Thompson was appointed Chief Engineer, South Indian Railway, in 1943, a position he held until his retirement in 1947. During his period as Chief Engineer, he was responsible for many projects in addition to his normal functions; these included the construction of the Royal Navy Base at Mandapam, and the building of Military sidings. In 1947 he was Chairman of the Engineering Section of the Indian Railway Conference Association and Vice-President for India of the Permanent Way Institution. He became a full member of the Institution of Civil Engineers in 1933. Since retirement he has been connected with the Elastic Rail Spike Co. Ltd.

Mr. V. A. M. Robertson, C.B.E., M.C., M.I.C.E., M.I.Mech.E., M.I.E.E., M.Inst.T., next month completes 50 years of service on work for British railways and for London Transport. Mr. Robertson was born in 1890, and educated at Dover College and the Crystal Palace of Practical Engineering. He was articled for three years, from 1909, to a consulting engineer to the L.N.W.R. In 1912 he became an Assistant to the New Works Engineer, S.E.C.R. He joined the London Regiment (London Scottish) in 1914, and in 1915 was gazetted to the Royal Engineers. He served in France until May, 1919, and was demobilised with the rank of Major, having won the M.C. and bar. In 1919 he rejoined the S.E.C.R., and in 1919 moved to the G.E.R. He became Divisional Engineer (Southern Division) L.N.E.R. in 1927. He was then appointed Civil Engineer to the Underground Railways, and retained that position on the formation of the L.P.T.B. In 1938 he was appointed Chief Engineer (Civil), and in 1940, Engineer-in-Chief, which position he resigned in November, 1943, to join the Southern Railway, ultimately to become Chief Civil Engineer in January, 1944. Mr. Robertson retired from railway service in 1951, and joined Sir William Halcrow & Partners. Since then he has been engaged on railway projects all over the world, including the Underground Railways in Auckland, Caracas, and Glasgow, the proposed new line from Southern Rhodesia to the West Coast of Africa, and the re-siting of the Kowloon terminus of the Kowloon-Canton Railway. In recent years, under his direction, the firm has been assisting the B.T.C. on its Modernisation Programme. These works include the construction of the Ripple Lane Railhead Depot and Marshalling Yard; Peterborough Goods Depot, and the Cambridge Diesel Maintenance Depot; the proposed Cheriton-Folkestone widening; bridge works in Birmingham, and the Crewe District Electric Depot. In May this year Mr. Robertson resigned his partnership in Sir William Halcrow & Partners, with which he is now a consultant, still engaged on railway work.

The late Mr. H. E. Thompson
Chief Engineer, South Indian Railway, 1943-47

Mr. V. A. M. Robertson
Completes 50 years service on work for railways

The final list of changes in the new Government include two of particular transport interest: Lord Chesham becomes Joint Parliamentary Secretary to the Ministry of Transport, succeeding Mr. G. R. H. Nugent. Mr. A. G. F. Rippon has been appointed Parliamentary Secretary to the Ministry of Aviation. This is a newly created office.

Mr. J. T. Turner has been re-elected Chairman of the Vehicle Committee, National Road Transport Federation. Mr. K. C. Turner has been elected Chairman of the Highways Committee.

Mr. Francis L. Lambert, Assistant Civil Engineer, London Midland Region, British Railways, has been appointed Chief Electrical Project Officer of that region. This is a newly-created position. Mr. Lambert will be responsible for progressing and co-ordinating on the ground the work of all departments concerned in the electrification of the Euston main-line.

Mr. M. W. Davies, Chief Commercial Manager, Rhodesia Railways, who, as recorded in our August 28 issue, has retired, was born in Cape Province in 1900. Mr. Davies joined Rhodesia Railways as a junior clerk in the Traffic Manager's Office, Bulawayo, in 1916. He resigned from the Railways, in 1917, and served in the 2nd Rhodesia Regiment in France. In 1919 he rejoined the railways as a clerk at Bulawayo. Two years later he became a Learner Foreman at Nyamandhlovu and was appointed Station Foreman, Tshontanda, in 1921. He was transferred to Sakania, Belgian Congo, in 1923. Until 1940 he served at Livingstone, Broken Hill, Salisbury, Bulawayo and Umtali, as a clerk and traffic inspector. During the 1939-45 war Mr. Davies rejoined the Army, attaining the rank of Company Sergeant Major, before being commissioned. The railways obtained his release in 1944, and he was appointed Assistant Operating Superintendent, at Beira, and in 1946 held the same position at Salisbury. He was promoted to be District Superintendent, Salisbury, in 1949, and apart from two years in Broken Hill, remained there until his appointment as Assistant Commercial Manager in 1954. Mr. Maurice Davies became Chief Commercial Manager in March, 1956.

Mr. M. W. Davies

Chief Commercial Manager, Rhodesia Railways, 1956-59

Mr. G. Mackenzie Junner has been re-appointed President of the Institute of Road Transport Engineers.

Lord Baillieu, President of the Dunlop Rubber Co. Ltd., has been elected as the President of The British Institute of Management.

Mr. M. J. S. Clapham, Joint Managing Director of Imperial Chemical Industries, Metals Division, has been appointed Chairman of that division from January 1. He will succeed Dr. M. Cook, who retires at the end of the year.

Mr. Michael G. Cohen is taking up residence in the U.S.A. as a Vice-President of George Cohen 600 Inc., the American company of the George Cohen 600 Group.

Mr. J. E. Smith, Director of Richardsons Westgarth & Co. Ltd., has been appointed Managing Director, National Gas & Oil Engine Co. Ltd., from January 1, 1960. He will also become a member of the Board of Hawker Siddeley Industries Limited.

The following changes in the organisation of English Electric Co. Ltd. in the Eastern Hemisphere will be made shortly. Mr. E. C. Fox, General Manager in India, will become Managing Director, English Electric Company of Australia (Pty.) Limited, at the beginning of January, in succession to Mr. C. W. Goodman, who has passed normal retiring age. Mr. Goodman will continue full-time service as Chairman of the Australian company. Mr. N. P. Dingwall, former Manager of the company's Calcutta office, will replace Mr. Fox, as General Manager, on November 1.

Dr. A. E. W. Austen has been appointed Chief Engineer, C.A.V. Limited. He has been Chief Research Engineer since 1946. Mr. W. E. W. Nicolls, Chief Development Engineer, since 1948, becomes Chief Engineer for Overseas Operations.

Mr. Roy Allan, Assistant Chief Commercial Manager, Rhodesia Railways, who, as recorded in our August 28 issue, has been appointed Chief Commercial Manager, was born at Kimberley, in 1908, and was educated at Rondebosch Boys' High School, Cape Town. Mr. Allan joined the Transportation Department, Rhodesia Railways, as a clerk in 1929. He was attached to the Chief Superintendent's Office, Bulawayo, and to the District Superintendents' Offices Beira, Salisbury and Livingstone. He worked at most of the larger stations and at the Agency, Elisabethville. He has acted as Road Transport Officer and as Stationmaster. Mr. Allan joined the General Manager's Office in 1945. He was appointed Assistant Superintendent, Rates & Public Relations, in 1950, and, when the Commercial Department was formed, in 1954, he was appointed Commercial Superintendent. He has been Assistant Chief Commercial Manager since March, 1956.

Mr. Roy Allan

Appointed Commercial Manager, Rhodesia Railways

Lord Gifford has been appointed an Additional Director of B.E.T. Omnibus Services Limited.

We regret to record the death on October 23, at the age of 75, of Sir Archibald Jamieson, former Chairman of Vickers Limited. Sir Archibald Jamieson had been a Director for many years of Robert Fleming & Co. Ltd.

Captain G. F. Jeffries
Marine Superintendent, Southern Region, who has retired

Captain P. C. E. Dove
Appointed Marine Superintendent, Southern Region

The late Mr. L. H. Joslin
Assistant to the Commercial Officer (Mineral), Eastern Region, 1958-9

Captain G. F. Jeffries, Marine Superintendent, Shipping & Continental Department, Victoria, Southern Region, British Railways, who, as recorded in our August 28 issue, has retired, was the first indentured apprentice to be carried in the Cunard Steamship Co. Ltd. On completion of his apprenticeship he served with Alfred Holt & Co. (Blue Funnel Lines), Furness Withy & Co. Ltd., and Grace Line Incorporated (New York). During the 1914-18 war, he served with the Merchant Navy. After obtaining his Master's Certificate, Captain Jeffries rejoined the Cunard Steamship Co. Ltd., and served in many of its ships, including the *Aquitania* from which vessel he came ashore to take up the newly created position of Marine Assistant to the Docks & Marine Manager, Southern Railway. He was appointed Marine Superintendent, Southern Region, in 1956. Captain Jeffries was closely concerned with the development and introduction of the twin-screw diesel ships which have replaced the paddle steamers on the Portsmouth–Isle of Wight service. In co-operation with the Superintendent Marine Engineer, he was directly concerned with the introduction of the Voith-Schneider propellers and diesel-electric independent paddles for vessels on the Lymington River Service.

Captain P. C. E. Dove, Assistant to the Marine Superintendent, Shipping & Continental Department, Victoria, Southern Region, British Railways, who, as recorded in our August 28 issue, has been appointed Marine Superintendent, Southern Region, holds a foreign-going Master's Certificate and has had 33 years at sea. He served an apprenticeship with Elders & Fyffes Limited, obtained a Second Mate's Certificate in 1927, and continued in foreign-going vessels for a further ten years. Captain Dove joined the Southern Railway in 1938, and, after service at Dover and Newhaven, moved to Southampton in 1939. His service during the 1939-45 war was mostly confined to hospital ships *Dinard* and *Isle of Jersey*. He was present at the invasions of Sicily and Italy. He resumed duties on the Southampton services after the war, and served in various grades and all vessels, being promoted to Master in 1950. Subsequently he took command of many passenger ships in the Channel Islands services. In September, 1956, Captain Dove came ashore, as Assistant to Marine Superintendent at Southampton. He moved to London with the amalgamation of the Shipping and Continental Departments the following January.

We regret to record the death, on October 19, of Mr. L. H. Joslin, Assistant to the Commercial Officer (Mineral), Eastern Region, British Railways. He joined the London & North Eastern Railway in 1924. Some five years later, after serving at a number of stations, he entered the District Commercial Superintendent's Office at Ipswich.

Mr. P. J. Conradie
Appointed System Manager, Windhoek, South African Railways

Mr. K. MacDonald
Appointed Assistant Chief Commercial Manager, Rhodesia Railways

Mr. A. J. Mahon
Appointed Passenger Traffic Manager, Winnipeg, C.P.R.

In 1935 he was transferred to the Southern Area Goods Manager's staff, Liverpool Street, to conduct staffing inquiries at stations. In 1939, Mr. Joslin joined the Goods Manager's Special Inquiry Section, dealing with changes in station organisation methods and accountancy for the release of staff to H.M. Forces. In 1945 he was moved to the Goods Manager's & Passenger Manager's Joint Staff Section. In 1947 Mr. Joslin became Deputy Head, Goods Manager's General Section. In 1948 he was appointed Deputy Head, Goods Claims Section. In 1952, when the Goods and Passenger Claims Sections were merged, he became Deputy Claims Assistant. Mr. Joslin was Acting Claims Assistant from November, 1956, until April, 1957, when he was appointed Chief Clerk to the Line Traffic Manager (Great Eastern). He became Assistant to the Commercial Officer (Mineral), Eastern Region, in May last year.

Mr. P. J. Conradie, Administrative Secretary to the Minister of Transport, South Africa, who, as recorded in our August 28 issue, has been appointed System Manager, Windhoek, was born in 1916 and joined the railways in 1934. Mr. Conradie became Private Secretary to the Minister of Transport, in 1950, and Assistant Secretary to the Railway Board in 1954. A year later he became Secretary to the Railway Board and was appointed Administrative Secretary to the South African Minister of Transport in 1956.

Mr. K. MacDonald, Commercial Superintendent, Rhodesia Railways, who, as recorded in our August 28 issue, has been appointed Assistant Chief Commercial Manager, was born at Glasgow in 1906. He was educated at Beauly School and Inverness Royal Academy and served for over three years in the Audit Departments of the Highland Railway at Inverness, and the London Midland & Scottish Railway, at Glasgow. In 1926 he joined Rhodesia Railways, as a junior clerk, at Salisbury. Since then he has filled various positions in the Rhodesias and Portuguese East Africa. For many years he was a member of the Transportation Department, and undertook duties in the Trains Section, including those of Senior Operating Clerk. He also was District Staff Clerk for long periods. Mr. MacDonald moved to Broken Hill, as Special Grade Commercial Clerk, in January, 1954, and the following year was appointed Assistant Superintendent Rates & Public Relations, Bulawayo. He became Commercial Superintendent in May, 1956.

Mr. A. J. Mahon, General Passenger Agent, Montreal, Canadian Pacific Railway, who, as recorded in our August 21 issue, has been appointed Passenger Traffic Manager, Winnipeg, joined C.P.R. in 1913. He served with the Royal Canadian Horse Artillery during the 1914-18 war. After working in Saskatoon, Regina and Vancouver, he was appointed General Agent, Seattle, in 1941, and, in 1947, became Assistant General Passenger Agent, Vancouver. Mr. Mahon was appointed General Passenger Agent, Winnipeg, in 1948, and General Passenger Agent, Montreal, in 1952.

We regret to record the death, on October 14, of Mr. F. W. Leake, Sales Manager (Works Administration), British Insulated Callender's Cables Limited, since 1956. Mr. Leake joined the company, in India, in 1923.

Mr. S. Hallam has been appointed Manager of David Brown Construction Equipment Limited, Meltham, Yorkshire. He was formerly Manager of the company's Northern Depot.

Mr. J. G. Arnold, Divisional Traffic Officer, Pickfords Division, British Road Services, has been appointed Assistant Heavy Haulage Manager, Pickfords Division.

Mr. W. A. Green and Mr. G. R. Green have been awarded the Percy Still Medal of the Diesel Engineers & Users Association for 1959, for their paper "Notes on the Jerk system of fuel injection."

Mr. L. B. Devins has been appointed General Manager of Sheffield Wire Rope Co. Ltd. He was formerly Sales Manager, Steel Rope Department, Wrights' Ropes Limited.

Mr. G. H. Hinds, Electronics Advisory Officer to the British Transport Commission, has been elected a Member of the Council of the British Computer Society. Mr. Hinds has been a Member of the Society since its formation.

Mr. Roger D. Turner, Deputy Managing Director of Wellington Tube Holdings Limited, has been appointed Managing Director. Mr. Douglas W. Turner, Chairman & Managing Director, becomes Executive Chairman and Mr. John T. Lewis has been appointed Vice-Chairman.

Mr. C. E. J. Bishop has been appointed Branch Sales Manager at the newly-opened Midlands Branch of the Holman Group, Lightning Way, Alvechurch Road, West Heath, Birmingham, 31. Mr. Bishop has been with the Holman Group for more than 10 years, and has been associated closely with the Midlands area.

Mr. Albert Maugham, Deputy General Manager, Machine Tool and Tool Divisions, David Brown Industries Limited, has retired. He will continue to be available on a part-time consultative basis. Mr. W. F. Howe has been appointed Manager of the Tool Division. He formerly was Manager of the Machine Tool & Contract Engineering Division, British Northrop Limited.

B.T.C. Appointments

The British Transport Commission announces the following appointments:

Finance Department

Mr. A. E. T. Griffiths, Traffic Costing Officer, Costings Division (London, Tilbury & Southend Line), as Principal Traffic Costing Officer, Euston.

Services of the Commission

Mr. F. Fancutt, Assistant Director (Chemical Services), Research Department, British Railways, as Assistant Director of Research (Chemical Services), Euston Square.

Mr. S. Bairstow, Area Chemist, Research Department, Derby, British Railways, as Assistant Director, Chemical Services Division, Derby.

D.E.U.A. Appointments

The following appointments have been announced by the Diesel Engineers & Users Association:—

President

Mr. James Calderwood.

Immediate Past-President

Mr. H. Adam.

Hon. Secretary

Mr. Julian S. Tritton.

Hon. Treasurer

Mr. D. S. Dodsley Williams.

General Committee Members

Mr. J. R. P. Smith and Mr. E. Bruce Wolfe.

Mr. F. A. Greene, who has held office as Hon. Treasurer for almost 30 years, did not seek re-election. Mr. C. W. J. Taffs, Secretary since 1954, also tendered his resignation. He is succeeded by Mr. A. P. Quarrell.

The Institution of Locomotive Engineers

The following names have been entered on, or transferred in, the register of members of the Institution of Locomotive Engineers:—

Transfer Associate Member to Member

Mr. F. G. Clements, Assistant (Diesel), Motive Power Officer's Office, Euston, London Midland Region, British Railways.

Mr. G. A. Weeden, Motive Power Officer, Waterloo, Southern Region, British Railways.

Transfer Graduate to Associate Member

Mr. W. Francis, Senior Assistant Projects Engineer, Hudswell, Clarke & Co. Ltd.

Mr. E. Horner, Assistant Mechanical Engineer, C.M.E.'s Department, East African Railways & Harbours.

Associate Members

Mr. D. G. Coates, Chief Instructor, Apprentices' Training School, Eastleigh, Southern Region, British Railways.

Mr. A. A. Cole, Senior Section Leader, Birmingham Railway Carriage & Wagon Co. Ltd.

Mr. S. R. G. Comfort, Assistant Electrical Engineer (Diesels), Bulawayo, Rhodesia Railways.

Mr. B. D. Gupta, Assistant Mechanical Engineer, Dhanbad, Eastern Railway, India.

Mr. D. C. J. Hoggan, Mechanical Engineer, C.M.E.'s Office, Eastern Railway, India.

Mr. G. A. Juarez, Inspector of Locomotive & Rolling Stock Construction, Argentine National Railways, Ministry of Transport, Buenos Aires, Argentina.

Mr. C. L. Kelly, General Assistant to Line Traffic Officer (Motive Power), Crewe, London Midland Region, British Railways.

Mr. J. N. Luthra, Mechanical Engineer (Operating), Eastern Railway, India.

Mr. J. L. Smith, Assistant Development Engineer (Diesel), Locomotive Development Unit, Derby, B.T.C.

Mr. J. Walley, Assistant to C.M. & E.E., York, North Eastern Region, British Railways.

Associates

Mr. A. F. Cook, Lecturer in Mechanical Engineering, Southampton University.

Mr. J. B. Douglas, Technical Representative (Electric Traction), Carbon Applications Electrical Department, Morgan Crucible Co. Ltd.

Mr. A. P. E. Hatz, Company Manager, Rail Traction Supplies Ltd.

Mr. F. J. G. Haut, Managing Director, F. J. Haut & Partners Ltd.

Mr. J. R. B. Mallik, Principal, Kanchrapara Technical School, West Bengal, India.

Mr. J. H. Marks, Director, Howell & Co. Ltd.

Major A. N. Stacey, R.E., Deputy Assistant Director, TN 1(c) (Railways), Transportation Directorate, War Office, London.

Graduates

Mr. J. D. Gardam, Technical Assistant (Traction Mechanical), C.M. & E.E.'s Office, Swindon, Western Region, British Railways.

Mr. S. R. Gupta, Assistant Mechanical Engineer (Tr.), Bitragunta, Southern Railway, India.

Mr. A. Howarth, Technical Assistant (P. & T.B.), Electric Traction Dept., Liverpool, London Midland Region, British Railways.

Mr. D. J. Rowland, Assistant Mechanical Engineer (Junior Grade), Bulawayo, Rhodesia Railways.

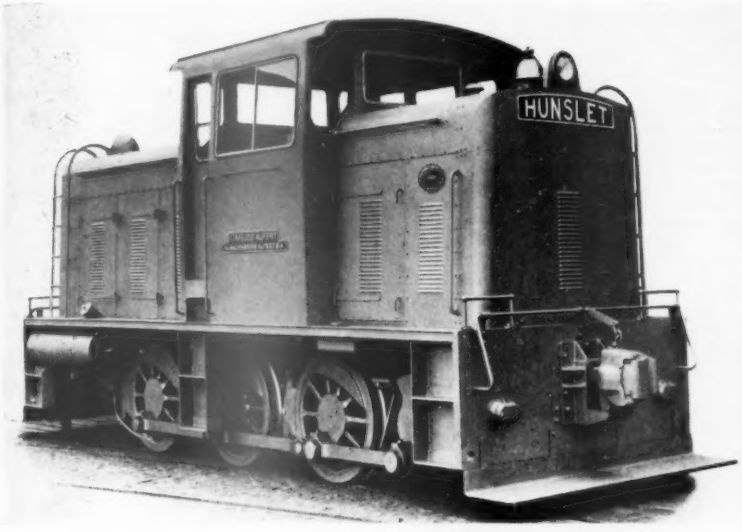
Mr. M. H. Sedgley, Resident Traction-Engineer, Eastern Railway, India, Electrification Project, English Electric Co. Ltd., Calcutta.

Students

Mr. G. Laidlaw, Draughtsman, C.M. & E.E.'s Department, Glasgow, Scottish Region, British Railways.

Mr. R. B. Smith, Engineering Apprentice, Locomotive Works, Derby, London Midland Region, British Railways.

NEW EQUIPMENT AND PROCESSES



Diesel-hydraulic Locomotive

A MODEL of the Hunslet standard 204 h.p. diesel locomotive has been developed incorporating hydraulic transmission. The new locomotive is of 0-6-0 type with a weight in working order of 30 tons. It is powered by a Gardner 8L3 diesel engine and Hunslet patent hydraulic transmission has been adopted in place of the four-speed mechanical gearbox previously employed. By this means a starting tractive effort of 20,700 lb. is achieved with performance through two speed ranges up to a maximum of 12 m.p.h. The single-stage torque converter requires virtually no maintenance. Designed for a relatively low torque multiplication it is capable of long continuous slow-speed working with heavy loads. This feature, combined with smooth starting characteristics, makes the locomotive suitable for wagon weighing, hump shunting and other duties of this nature.

The roomy, comfortable, cab, well-provided with windows, is mounted toward the centre of the locomotive to ensure good all-round visibility, a valuable safety feature which also increases the speed of working. The floor of the cab is completely flat, giving unobstructed movement between the driving positions on either side. It also provides maintenance accessibility, the engine and transmission being situated entirely within the two end compartments.

The power-assisted controls, which are duplicated on both sides of the cab, are mounted on a desk facing the short end of the locomotive. They include a powerful straight air brake actuating cast-iron brake blocks on all six wheels. Control of the train is not solely dependent on the air brake a converter/fixed drive control allows use of the converter to be dispensed with and the full power of the diesel engine to be used to assist braking. Tests have proved that the smooth operation of engine braking gives a vast reduction in stopping distances, particularly under greasy rail conditions. This is of great importance in view of the immense loads which can be started by a diesel-hydraulic locomotive where the initial tractive effort is limited solely by adhesion.

Further details can be obtained from the Hunslet Engine Co. Ltd., Hunslet Engine Works, 125, Jack Lane, Leeds, 10.

Edgefinder

THE Apwar Edgefinder is designed primarily for use on jig boring machines but market research has already indicated that it may find acceptance over a much wider field.

It accurately locates the machine spindle centreline in relation to the edge of the component to be machined. Relative position is given to within 0·0002 in., and is secured by automatic light combinations observed by the operator from illumination ports in the body of the instrument. A torch battery enclosed within the instrument provides the necessary power for illumination.

The device has a ⅜-in. dia. parallel shank, and can therefore be used in any tool-holding device capable of accommodating this size of shank. As it is unnecessary for the body of the instrument to run absolutely true, any chuck in reasonable condition will give desired results.

The device shows to considerable advantage on large machines where the control handle is far from the spindle. With its long reach and small diameter it can locate against normally inaccessible edges.

Price is less than £5. Further details can be obtained from A. P. Warren Limited, Carl Edvard House, 37, Sheen Road, Richmond, Surrey.

Scanning Unit

THE PW.4083 scanning unit is designed—in conjunction with other units of the spectrometer—to sweep the energy spectrum at various speeds. Although mainly for use with the Philips single-channel pulse height discriminator it can also be used with other types.

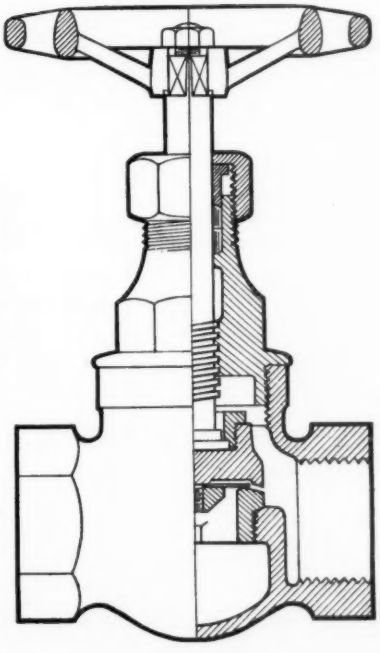
The unit contains a helical potentiometer driven by a synchronous motor via a gear change box with friction coupling. This arrangement offers a choice of four different scanning times ranging from 3·5-100 min. The potentiometer can be manually operated. Provision is also made for automatic stopping of the motor on completion of a scanning period. A "forward-reverse" selector reverses the motor and the connection of the helical potentiometer, so that the spectrum is always scanned from zero to maximum.

Further details can be obtained from the sole distributors in the U.K., Research & Control Instruments Ltd., Instrument House 207, King's Cross Road, W.C.1.

Steam Valve

THE 2016 "Preseator" globe valve, suitable for steam at 200 lb. per sq. in. and 500 deg. F., is claimed to overcome the destructive wire-drawing effect of steam.

The valve incorporates a flexible titanium alloy disc, resistant to corrosion and erosion which closes before the main seating surfaces. The broad-faced clack and seat are of differing nickel alloy composition to give a differential surface hardness which prevents galling and seizure. Sequence of operation is such that the main seating surfaces are protected



from pipe scale and wire drawing. The valve has been tested over years on many different installations under service conditions and is suitable for operation in the part-open position. It is available with threaded or flanged ends. Further details can be obtained from Hattersley (Ormskirk) Limited, Ormskirk, Lancashire.

Lighting for Public Transport

A CONVERTER using two OC 28 transistors connected in push-pull overcomes the problem of converting low-voltage d.c. from battery to higher-voltage a.c. As no filament heating is required, circuit efficiency is high—80 per cent. Maximum load at present is one 40-w. 4-ft. lamp or two 20-w. 2-ft. lamps.

The illustration shows the new lighting in use on a Reading Corporation trolleybus. Tests are also being made in an omnibus. The battery voltage in both instances is 24, which enables standard ballasts to be used on both types of vehicles.

Each semi-recessed fitting has one 20-w. 2-ft. lamp and a plastic diffuser. There are six to each saloon (three on each side) and one on the platform. In addition, the three destination boxes are equipped with single channels without diffusers to light the destination indicators: these are now much clearer to read.

Illumination level is on average 10 lumens per sq. ft., an increase of more than treble the previous amount, while load has been almost halved.

Platform illumination has been increased from approximately one to five lumens per sq. ft.

Further details can be obtained from Philips Electrical Limited, Century House, Shaftesbury Avenue, London, W.C.2.

Sleeper-ejector and Trackliner

THE Mannix Auto-Track is a new labour-saving sleeper-ejector and trackliner measuring 56 ft. in length for single-line (or 61 ft. for double-line) operation. Combined with the Mannix undertrack plough, it knocks down and ejects sleepers to be renewed and approximately re-aligns the skeletonised track. Moreover, it makes possible the removal or insertion of the under-track plough without the aid of a bulldozer and with fewer men. It is operated hydraulically, power being supplied by a 56-h.p. internal combustion engine. As a track-laying machine it works under its own propulsive power, and, with pressure at three points in its length, it forces the skeleton tracks into alignment.

When ejecting sleepers it is attached to the front end of the plough which is pulled ahead by a work-train. The sleepers to be removed are marked and as they are passed in the raised position are knocked down by a hydraulic hammer on each side of the machine and thrown out by a 3-ft. wide belt conveyor drawn behind the plough beneath the track. Some 4,000 ft. of finished single-line can be produced in a day, the machine being operated by five men. It is estimated that it saves from 18 to 25 men according to the weight of track and other factors.

Further details can be obtained from Mannix International Inc., 4020, Minnetonka Boulevard, Minneapolis 16, Minn., U.S.A.

Self-propelled Gang Trolley

DEVELOPED specifically for use on overseas railways, a heavy-duty rail motor gang trolley with orthodox vehicle transmission is available.

The trolley is fitted with an American six-cylinder petrol engine and truck-type gearbox: the manufacturer states that an American power unit is preferred in areas where good servicing facilities for American equipment have been established.

Drive is taken from a Ford gearbox by Hardy Spicer cardan shaft to a totally-enclosed Wickham forward-and-reverse gearbox mounted on the drive axle. The 18A Mk. VI trolley can seat 10 workmen including the driver and can accommodate a quantity of tools. Canvas screens provide weather protection and screen wipers are fitted to the driver's screen. Sufficient power is available for hauling additional personnel or material trailers.

A type " F " Ford industrial engine with a bore of 3·62 in. and stroke of 3·6 in. is incorporated. Maximum power rating is 107 b.h.p. at 2,800 r.p.m., and a 12-V. circuit is used for the electric starting and lighting equipment. Alternative makes of petrol or diesel engines can be fitted to customer's requirements.

A number of these cars is being supplied for service in the Belgian Congo. The basic layout of the trolley is used for a long wheel-base model and for overhead line inspection vehicles, full details of which can be obtained from the manufacturer, D. Wickham & Co. Ltd., Ware, Herts.

Portable Boiler

ECONOMICAL cleaning of railway freight, tank, refrigerator and box wagons is claimed through use of a new compact portable boiler. This is available in 40 and 50 h.p. sizes. Called Monitor portable boilers, they measure 15 ft. long x 4 ft. wide x 5½ ft. high. Weight is about 5,000 lb. The specially-constructed frame with hard rubber wheels provides good mobility. The 40-h.p. unit has an output of 1,380 lb. of steam an hour at 212 deg. The 50-h.p. boiler delivers 1,725 lb. of steam an hour at 212 deg.

Each unit is equipped with a water make-up tank which holds enough water for an hour's operation. A simple hose connection from a local water supply will normally provide water at 20 to 40 lb. pressure for continuous and automatic operation.

The units are fired with light oil and each boiler has an oil storage tank of 80 gal. capacity; this tank holds sufficient fuel for about a seven- to eight-hour operation.

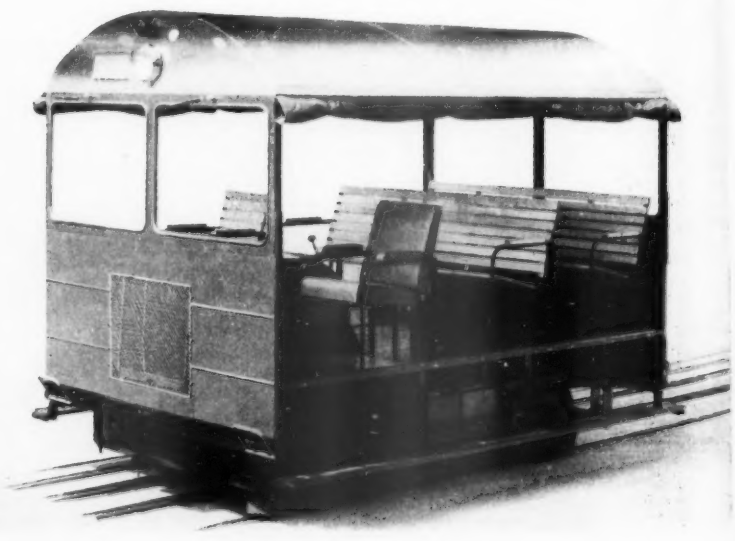
Tests have demonstrated that the steam from the mobile boilers cuts through dirt and residue left from previous shipments, leaving the wagons spotless in a matter of minutes. Ice deposits on refrigerator wagons are thawed and washed away quickly, and even fats and tallow left on the walls of meat wagons evaporate.

Further details can be obtained from the Cleaver-Brooks Company, Milwaukee, Wis., U.S.A.

Logarithmic Attenuator

THE PW.4073 logarithmic attenuator provides logarithmic attenuation of pulses before amplification. Constant accuracy throughout the spectrum and a better comparison of intensities are claimed for the instrument.

Further details can be obtained from the sole distributors in the United Kingdom, Research & Control Instruments Ltd., Instrument House, 207, King's Cross Road, W.C.1.



New Marshalling Yard at Carlisle, L.M.Region

Automatic route-setting and primary and secondary retardation of wagons

Work has begun on a new £4,750,000 marshalling yard at Carlisle, British Railways, London Midland Region, to facilitate the speedy transfer of goods traffic from and to England and Scotland.

It is expected that the yard will be in operation in 2½ years' time, replacing nine other yards at Carlisle, namely, Kingmoor up and down yard, Viaduct, Currock, Canal up and down sidings, Upperby, Durren Hill and Petteril Bridge. The remaining present yard at London Road will continue to operate for a time after the new yard is functioning.

Reduction in Wagon Movement

The present yards were constructed by various railways terminating at Carlisle and involve the transfer of wagons and much shunting, attaching, and detaching of wagons resulting in excessive handling. The new yard will eliminate this time and money wastage, and handle some 258 freight trains a day. It will have 101 sorting sidings, 18 reception sidings, and 20 departure sidings. The main features will be:

Press-button automatic route-setting of all points between the reception sidings and the main sorting sidings including the ability to set up the routes for a whole train before shunting is commenced.

Mechanical retardation of wagons by primary and secondary retarders, including automation to eliminate as far as possible, human judgment.

Colour-light signal control of humping operations.

Concentration of point operation and press-button route-setting at the outgoing end of the main sorting sidings and the inlet end of the departure sidings to speed up the movement of engines and traffic between the two groups of sidings.

Diesel shunting power.

Staff amenities in accordance with modern standards.

A traction stabling depot to accommodate diesel and electric locomotives during marginal periods, to reduce light engine movements to and from the main depot.

Modern standards of lighting throughout the yard area.

A communication system comprising wide loudspeaker coverage; an automatic intercommunication telephone system; internal omnibus circuits; circuits connecting selected points with Carlisle control room; extensions to selected points from Carlisle Citadel exchange; a teleprinter circuit between Carlisle telegraph office, control room and the Yardmaster's office; pneumatic tubes for the dispatch of cut-lists from each end of the reception sidings to the Hump Inspectors and from the Hump Inspectors to the control towers; radio communication between shunting engines and control towers, to supplement fixed and hand signals.

Static vacuum testing plants in the departure sidings.

An electric clock system with synchronised dials at various amenity blocks and offices and also three large exterior illuminated dials, elevated and showing in two directions, at the main departure points.

Centralised signalling, based upon control towers, for the control of movements into, out of, and within the yard area.

Permanent Way and Signalling Work

The work also includes running line alterations between Longtown and Gretna Junction, Gretna Junction and Rockcliffe, Canal Junction and Brunthill, and at Rome St. Junction. A power signalling installation will be provided on the main lines between Carlisle No. 3 and Gretna Junction signalboxes resulting in the closure of the existing signalboxes at Etterby Junction, Rockcliffe and Floriston.

The Longtown branch will also be resignalled on the basis of one-directional through working from Longtown to Gretna Junction. A new signalbox will be built at Kingmoor and alterations made to the existing installations at Rome St. Junction, Canal Junction, and Longtown Junction in the London Midland Region and Gretna Junction in the Scottish Region.

Because the construction of the new yard will necessitate major signalling alterations on the main line North of Carlisle and bearing in mind that electrification of the line from Glasgow to Carlisle via Carstairs is planned for completion within a few years, the opportunity is being taken to cater both for the requirements of the new yard and eventual main line electrification.

Improvements to Chelmsford Station

Chelmsford Station, British Railways, Eastern Region, is to be substantially modernised at street level within the existing structure. Since 1950, the population of Chelmsford, the county town of Essex, has increased from 47,000 to 58,000. Stimulated by industrial developments and improved train services, the lines to London were electrified in 1956, the number of passengers using Chelmsford Station has more than doubled over the same period and has now reached over 2,000,000 each year.

The current upward trend of passenger business is expected to be accentuated when the electrified lines now terminating at Chelmsford are extended to Colchester to link up with those to Clacton, Frinton, and Walton in 1962, and as industry in the town develops still further.

Redesigned Circulating Area

The improvements to be carried out include the re-arrangement and enlargement of the circulating area where there is to be a completely new ticket office, equipped for mechanised ticket issuing. The front of the ticket office will be of glass, timber, and mosaic opening on to the redesigned booking hall. Here, a suspended ceiling with side-strip lighting, and light-coloured hard-wearing materials will create a feeling of space within the limitations of the structure. A separate enquiry office, a parcels and left luggage office, and cycle storage will also be provided, together with a new bookstall, automatic machines, and telephone kiosks.

In place of the existing separate ticket barriers on each of the up and down platforms, there will be a central examination point at street level. This will be achieved by the remodelling of the staircases to form a more convenient link between the street and the platforms. Staff accommodation will also be improved with the provision of messrooms, with cooking facilities, and locker rooms. Externally, the existing canopy will be replaced and lighting installed to create an attractive appearance by night. Both platforms are to be extended to accommodate 12-car trains and there will also be some minor alterations to the track.

British Railway Two-tier Motorcar Transporters

One of six two-tier motorcar transporters being supplied to British Railways, Western Region, by Newton Chambers and Co. Ltd. is to be exhibited at the Railway Freight Transport Exhibition at Bristol.

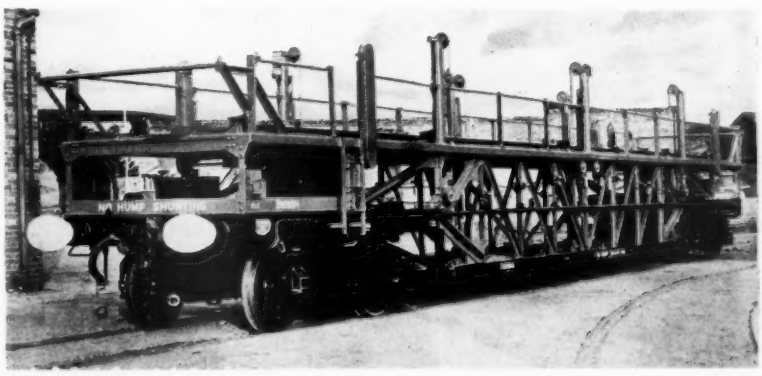
The vehicle was designed and made in the manufacturers' Engineering Division at Thorncliffe. It is the first of its kind to be made in this country and has been tested in regular use on Continental and British railways. The first 12 of these wagons were made and supplied to M.A.T. Transport Limited, and are used for the transport of motorcars to and from Germany via Harwich. The vehicles now being supplied to British Railways have had slight amendments made to suit British railway practice and requirements. It is understood that they will be used for moving motorcars from factories to ports of shipment.

Five motorcars can be accommodated on the upper and two on the lower deck.

Two hand-operated platform hoists form the centre portion of the wagon. When raised the top and bottom decks of the hoists come up together, providing a perfectly flush top deck. All loading is carried out from the top deck where the operators are not hampered by lack of space.

Possible Developments

A motorcar can be raised from the well to the unloading position by two men in about six minutes. The possibility of using power-operated winches is being considered by Newton Chambers & Co., Ltd., and another possible development is to sheet-in the wagon completely so that all vehicles being carried are protected from the weather.



Two-tier motorcar transporter built by Newton Chambers & Co. Ltd. for British Railways, Western Region

Production of High-Duty Iron Alloy Castings

The many and varied products of John Harper & Co. Ltd. were shown at a recent conference held at Albion Works, Willenhall. This modern foundry, with a personnel strength of 1,300, is one of the largest in Great Britain producing castings in Meehanite, spheroidal graphite iron, and grey iron. Castings of great accuracy and with a high degree of finish for railway applications include large quantities for the makers of signal equipment, torque converters, diesel engines, and electric traction. The normal work flow covers castings ranging in weight from a few ounces up to about 20 cwt.

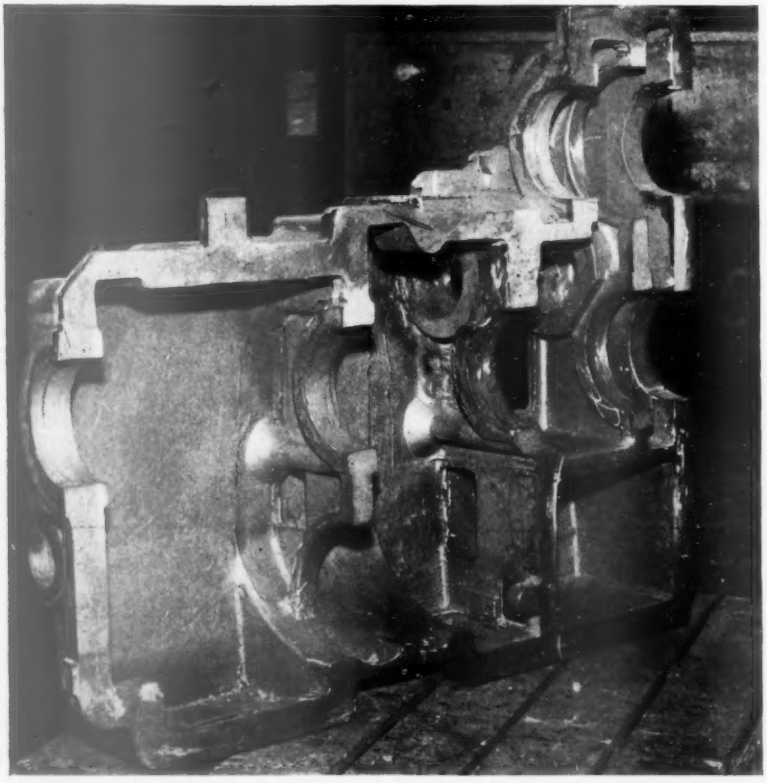
Production runs are fully mechanised, and small runs of jobbing work are merged with the general flow at an early stage in processing to ensure maximum utilisation of machine equipment.

The melting furnaces are of the hot blast water-cooled continuous-tapping type, each having a capacity of approximately 30 cwt. an hour. For annealing, a Birlec electric cylindrical pit-type furnace of 110 kW. rating is used. The core-making departments are fully equipped with modern machine equipment, extensive use being made of the shell moulding and CO_2 techniques. Wood and metal patterns and core-boxes are used according to quantity requirements, and a recent development is the use of plastic moulds made in epoxy-resin. This is intended for batch quantities which do not justify the production of metal patterns.

Quality Control and Research

The company maintains an extensive laboratory for the control of sand, material specifications, and physical, chemical, and electrical testing. The equipment includes an electric furnace, a 50-ton Denison hydraulic testing machine, a Vickers projection microscope giving up to 4,000 : 1 magnification, and a Fuess spectograph for material analysis. The laboratory also carries out a limited amount of basic research on new materials and techniques.

Adjacent to the foundry is a machine shop. A proportion of the castings are supplied fully machined and others rough machined for initial stress-relieving purposes.



The Meehanite casing for a locomotive hydraulic transmission unit—an example of the high-duty iron-alloy castings shown at Willenhall

Staff and Labour Matters

N.U.R. Wage Claim

A meeting of the Railway Staff National Council took place on October 23, at which the claim of the N.U.R. for a substantial increase in rates of pay for railway salaried and conciliation staff was submitted.

The main grounds of the claim were: cost of living, comparison with increases granted in other industries, and the fact that the staff should receive some benefit from the savings accruing from the Modernisation Plan and the various economy measures which have been made.

After hearing the arguments advanced by the N.U.R. in support of the union's claim, the meeting stood adjourned to enable the Commission's representatives to examine the union's submissions and to give a considered reply as soon as possible.

The Railway Staff National Council is the second stage in the machinery of negotiation for railway staff on which representatives of the Commission and of the three railway trade unions sit.

The Chairman of the Commission's Side at the meeting was Sir John Benstead, Deputy Chairman of the Commission. He was accompanied by Mr. K. W. C. Grand, two representatives of Area Boards, the General Managers of the London Midland and Western Regions, the Manpower Adviser, and other officers of British Railways.

The case on behalf of the N.U.R. was presented by Mr. S. F. Greene, General Secretary of the union.

Rail Dining-Car Strike

Manchester dining-car men decided on unofficial strike action from midnight, October 25/26 in protest against a decision to start a Pullman Car service between Manchester and London. They were joined by the restaurant car workers from three London stations: Euston, St. Pancras, and Kings Cross. Dining-car attendants at Newcastle-on-Tyne have also decided to stop work from midnight on October 28 in support of the Manchester men. The dining-car staffs at Paddington decided to join the unofficial strike as from midnight, October 27/28.

The Manchester men claim that the Pullman attendants will be given the better and more lucrative services, pushing them into the background. Although they are safeguarded against redundancy under an agreement between the British Transport Commission and the N.U.R., the men feel that they will be likely to serve only on the less popular trains.

A new agreement has recently been concluded between the British Transport Commission, the Pullman Car Company and the N.U.R. Under this agreement, the Pullman Car staff get substantially improved rates of pay and conditions of service but, at the same time, the position of British Railways' Restaurant Car staff has been safeguarded. As from November 1, Pullman staff will have parity in pay with British Railways' Restaurant Car staff.

In a statement in the *Railway Review* giving details of the new agreement it is stated:

"During the negotiations, which have been going on for a considerable time, the Commission explained that the service provided by the Pullman Company was different from the Restaurant Car service. Many business men travelled by rail only because of the attraction of the Pullman service which was, therefore, a strong 'selling point' and brought additional revenue to the Commission by way of supplementary fares. It was, therefore, in the interests of the Commission to provide both types of service as, after paying fixed charges and interest on preference stock, all the profits of the Pullman Company came to the Commission.

"The Commission declared that it was not its policy to enter into wholesale extension of Pullman Car services. It was only on certain routes that there was a demand for this type of service, and there were no immediate plans for further Pullman services except those already scheduled to run between London and Manchester and Bristol and Birmingham. There was no question whatsoever of doing away with the Restaurant Car services and replacing them by Pullman services.

"The Pullman Company has emphasised that it was not its aim or policy to cover the country indiscriminately with Pullman trains. They felt that this type of service must be treated selectively."

The General Secretary of the N.U.R., Mr. S. F. Greene, has made an appeal to railway dining-car workers on unofficial strike to go back to work. He stressed that any complaints in regard to the new agreement should be raised through the normal union channels.

The strike, which commenced on October 26 at Manchester, spread to Euston and St. Pancras and trains operated from Kings Cross and Liverpool Street were also

affected. It is expected that Liverpool will also be involved.

After a 2-hr. meeting on the evening of October 26, the Manchester men decided to continue the strike and to hold a further meeting on October 29.

Shorter Working Hours

Leaders of the N.U.R., A.S.L.E. & F., and T.S.S.A. had a joint meeting in London on October 26 to discuss the possibility of working together to secure a shorter working week for all grades of railwaymen. The leaders of the unions are reporting back to their executive committees. It is expected that there will be another joint meeting in about a month's time.

Modernised Signalling on L.T.E. East London Line

Improved signalling arrangements for Whitechapel and Shoreditch Stations on the East London Line were brought into use by the London Transport Executive on October 18.

At both Whitechapel and Shoreditch special control arrangements now enable the reversing of trains to be carried out automatically, the points and signals setting themselves in a pre-arranged sequence started by the movement of the trains themselves. Trains run to Shoreditch in the peak hours only and are reversed at Whitechapel at other times. The automatic reversing feature, for which provision is already made at certain other London Transport stations, is brought into use at either Shoreditch or Whitechapel by turning an appropriate switch in the Whitechapel, District Line, signalbox and thereafter, in normal circumstances, needs no further action by the signalman.

Remote Control Panel

The signalman at Whitechapel can take control of the signalling at the two East London Line stations at any time, should special train movements be required. He uses a new push-button remote control panel fitted in his box and follows the train movements as displayed on an illuminated diagram.

The push-buttons are each arranged to set up a particular route for a train and are automatically restored to the normal position when the train has passed over the route concerned. A second route can be set up and "stored" until movement over the first is completed, when the signals and points will automatically be arranged for the stored route. The signalling at Whitechapel, East London Line, was previously controlled by a mechanical locking frame. This has now been taken out of use and the mechanically-operated points associated with it have been converted for electro-pneumatic operation.

The signalling at Shoreditch was formerly remotely controlled from Whitechapel, East London Line, signalbox, but could be operated locally at Shoreditch if required. Shoreditch is now completely supervised from Whitechapel, District Line, signalbox.

Contracts and Tenders

Steel works diesel locomotive order for Ruston & Hornsby Limited

Ruston & Hornsby Limited has received an order from the Colville Group of steel companies for 12 Mark "165DE" 150-b.h.p. 28-ton 0-4-0 diesel-electric locomotives arranged for single or tandem operation. Five are for the group's Dalzell works, four for the Glengarnock works, and three for the Lanarkshire works.

The London Transport Executive has placed a contract with William Old Limited, for alterations to Amersham Station. The work includes the provision of a new roof for part of the northbound platform, which is to become an island platform; extension of the roof of the southbound platform; provision of new lamp-posts and suspension points for fluorescent lighting; minor building extensions, and general renovations and exterior repainting. These alterations form part of the work required to adapt Amersham Station to its role as the terminus of the Metropolitan Line when the electrification and four-tracking works are completed in 1962. The value of the contract is over £8,000 and the work should be completed in four months.

British Railways, Eastern Region, has placed the following contracts:

R. G. Horton (Engineers) Limited: reconstruction of portion of super structure of East Street overbridge over down Tilbury and westbound (L.T.E.) lines between Barking and Dagenham Dock

T. Fletcher & Co. Ltd.: reconstruction of underline bridge over New River between Ware and Hertford

Carter-Horseley (Engineers) Limited: waterproofing and repairs to bridges Nos. 1361 and 1363, between London Fields and Hackney Downs.

British Railways, North Eastern Region, has placed the following contracts:—

E. Davis (Fixers) Limited: supply of steelwork for repairs to bridges Nos. 9 and 10 at Goole on the Hull-Doncaster line

Jas. Childs: demolition of a water tower at York Carriage & Wagon Works

Greensitt Bros. Ltd.: construction of a new signal box at Hartley on the Newcastle-Blyth line

Arthur Robinson (Contractors) Limited: earthworks and drainage at Newport New Marshalling Yard, Middlesbrough

Automatic Telephone & Electric Co. Ltd.: installation of a new traffic control telephone system at Middlesbrough Station

Cawood Wharton & Co. Ltd.: extension of the cattle creep under the main line at Hob Moor (Dringhouses) south of York

Holmpress Piles Limited: piling work at English Street Goods Shed, Hull

Sam Allen Limited: demolition of coaling stages at Hull Botanic Gardens Motive Power Depot.

The Special Register Information Service Export Services Branch, Board of Trade, has received calls for tenders as follow :

From South Africa :

290 breaker control and closing relays,

Opening of New B.T.C. Police Headquarters

(*See last week's issue*)

Left, the new building at Coronation Road, Park Royal, London, and right, Mr. K. W. C. Grand, a Member of the B.T.C. and Chairman of the Police Committee, opening the premises. On his left is Mr. Arthur C. West, Chief Constable of the B.T.C. Police

in accordance with S.A.R. specification SEIC.8/3 amendment No. 2

50 spare relay operating coils

50 spare economy resistances

The relays are required for the 110-V. d.c. low tension control of 3,000-V. d.c. high-speed circuit breakers employing 110-V. d.c. holding coils for magnetic latching, and separate 100-A. 110-V. d.c. operated contactors for the closing solenoids of the breakers.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. C.7931: Breaker Control and Closing Relays" should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is November 20, 1959. Local representation is essential. The Board of Trade reference is ESB/25069/59.

2 electric motor-driven, heavy-duty, locomotive spotters, i.e., mobile units, each capable of moving steam locomotives over short distances for setting locomotive valves, coupling of tenders to locomotives, and removal of coupling rods, knuckle and gudgeon pins, as per specifications.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. F.7936: Engine Spotters," should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is November 13, 1959. Local representation is essential. The Board of Trade reference is ESB/24805/59.

500 insulating tubes for electric boilers, for Class "3E" electric locomotives to specification No. TES–T6A–1/59 S.A.R. item 385/8552.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. K.4017: Insulating Tubes" should be addressed to the Chief Stores Superintendent, P.O. Box 8617, Johannesburg. The closing date is November 18, 1959. Local representation is essential. The Board of Trade reference is ESB/24802/59.

From Portuguese East Africa:

380 rails of 12 m., 30 kg.

380 pairs of fishplates for 30 kg. rails

10 sets of points, complete, 1 : 8, right

16 sets of points, complete, 1 : 8, left

1,600 rail bolts with nuts and washers for 30 kg. rails

500 rail bolts with spring washers for 30 kg. rails

150 "MACK" protectors for 30 kg. rails, low section

2 sets of points, complete, 1 : 11, left.

The issuing authority is the Ports, Railways & Transport Department, Lourenco Marques. The tender No. is 1/60. Bids should be accompanied by a provisional deposit of Esc. 1,000 for rail bolts and protectors, Esc. 17,500 for rails, and Esc. 30,000 for points. The closing date is January 27, 1960.

From Pakistan:

1 motor trolley for broad-gauge track, petrol driven, provided with 10 seats, including crews, seats should be adjustable type to convert into four berths for evacuation of casualties in case of emergency. Trolley should be complete with h.t. lamps, tools and accessories.

2 motor trollies as per the above item, but for metre-gauge track.

The issuing authority is the Department of Supply & Development, Government of Pakistan. The tender No. is DS/D/I/6286/ENGG/59. Bids should be sent to the Director General, Department of Supply & Development, Chittagong. The closing date is November 3, 1959. Local representation is essential. The Board of Trade reference is ESB/24710/59.

From Trinidad:

2 electrically-driven pumps 1,000 gal. per min., 50 ft. head

2 electrically-driven pumps 1,000 gal. per min., 150 ft. head

1 transformer 1,250 kVA., 33,000/415V., 60 cycles

1 liquid earthing resistor, 33,000V. a.c., 20 ohms, 30 sec. rating

Paper insulated multicore cables 660 and 1,100V.

1 65/70 tons load well-wagon, new or re-conditioned.

The issuing authority and address to which bids should be sent is the Purchasing Officer, Trinidad & Tobago Electricity Commission, G.P.O. Box 121, Head Office, 63, Frederick Street, Port of Spain, Trinidad. The closing date is November 30, 1959. The Board of Trade reference is ESB/25243/59.

From Korea:

An unspecified quantity of narrow gauge railway equipment.

The issuing authority and address to which bids should be sent is the Office of Supply, Government of the Republic of Korea, Seoul, Korea. The tender No. is 609R. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is November 13, 1959. The Board of Trade reference is ESB/25332/59/I.C.A.

Further details relating to the above tenders together with photo-copies of tender documents can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1).

Coras Iompair Eireann has called for tenders for the supply of diesel locomotives and parts as follows:

15 mixed traffic bogie diesel locomotives of not less than 800 h.p. with top speed of 70 m p.h.

14 shunting and transfer diesel locomotives of not less than 400 h.p. with top speed of 45 m.p.h.

14 sets of diesel engines and transmission equipment of not less than 400 h.p. suitable for installation in locomotives similar to those mentioned in the above item.

7 shunting diesel locomotives of not less than 160 h.p. with top speed of 25 m.p.h.

Copies of conditions of tendering, general conditions of contract, specifications, drawings and forms of tender may be obtained on application to the Chief Engineer, Coras Iompair Eireann, Inchicore Works, Dublin. Applicants should indicate the items for which documents are required. Applications must be accompanied by a deposit of £10 which will be refunded on receipt of a bona fide tender. Tenders and accompanying documents enclosed in a sealed cover must reach the Secretary, Coras Iompair Eireann, Kingsbridge Station, Dublin, not later than January 20, 1960.

Notes and News

Institution of Locomotive Engineers' Dinner and Dance.—A dinner and dance will be held by the Institution of Locomotive Engineers for members and their guests at the Dorchester Hotel, Park Lane, W.1, on December 17 at 7.15 for 8 p.m. A reception will be held by the President, Mr. R. A. Smeddle, and Mrs. Smeddle, from 7.15 to 7.50 p.m. The cost of a single ticket is £2 5s., and £4 10s. double, and applications for tickets should be made not later than December 3.

Western Area Board Visit to South Wales.—The Western Area Board of the British Transport Commission and officers of British Railways Western Region, visited South Wales on October 13 and 14, to inspect various railway installations and equipment and meet the Officers of the new South Wales Divisional Traffic Organisation. The illustration shows the party at Cardiff General Station before leaving for Margam to see the new marshalling yard. (Left to right): Messrs. A. E. Flaxman, Commercial Officer; A. C. B. Pickford, Assistant General Manager (Traffic); M. G. R. Smith, Chief Civil Engineer; F. A. Parish, Area Board Member; J. H. F. Page, District Traffic Superintendent, Cardiff; P. T. Heady, and A. Chamberlain, Area Board Members; W. Griffiths, District Commercial Officer, Swansea; C. H. Swancutt, Stationmaster, Cardiff General; H. G. Bowles, Assistant General Manager; W. R. Stevens, Divisional Traffic Manager, Cardiff; H. E. A. White, Running & Maintenance Officer; R. F. Hanks, Chairman, Area Board; H. S. Jenkins,

Members of the Western Area Board and officers of the Western Region at Cardiff General before departure for Margam

Divisional Commercial Officer, Cardiff; J. R. Hammond, General Manager; J. W. J. Webb, Regional Accountant; C. W. Rodd, Area Board Member; A. A. A. Cardani, Signal Engineer; N. S. Robinson, District Engineer, and L. G. Morris, District Running & Maintenance Officer, Neath; T. C. Donovan, Acting Area Board Secretary; and Sir John Carew Pole, Bt., Area Board Member.

Southern Region Electric Boat Expresses.—The number of 250-h.p. motors in each of the three four-car units in a London-Dover boat express *via* Chatham is four, and not two, as stated in error on page 290 of our October 16 issue. There is one 500-h.p. motor, and not one 250-h.p. motor, in each of the two luggage vans. The total power available in a train of 14 cars including two motor luggage vans, therefore, is 4,000 h.p.

Engineer & Railway Staff Corps Dinner.—The annual dinner of the Engineer & Railway Staff Corps, R.E.(T.A.), was held on October 22, at the Charing Cross Hotel. Colonel Sir John Elliot, Officer Commanding presided, and the guests were: Lt.-General Sir Harold Pyman, Lt.-General G. S. Thompson, Maj.-General Sir Donald McMullen, Maj.-General Ll. Wansbrough-Jones, Brigadier C. H. Barnett, Brigadier H. W. Kitson, and Brigadier C. A. Langley.

Institution of Locomotive Engineers' Paper on Swindon-Built Diesel-Hydraulic Locomotives.—A paper entitled "The Swindon-Built Diesel-Hydraulic Locomotives" will be read by Mr. G. E. Scholes before a general meeting of the Institution of Locomotive Engineers at the Institution of Mechanical Engineers, London, on November 17. It describes the 2,200-h.p. Type "4" B-B locomotives of British Railways, Western Region, although attention is confined mainly to such unusual features as the lightweight construction, the patent bogies, the Maybach engine, the transmission, and the cooling system. Reference is also made to building the locomotives and to their performance.

Main-Line Diesel Haulage in the L.M. Region.—With the introduction of British Railways, London Midland Region winter timetable on November 2 all London-Euston trains will be hauled by diesel-electric locomotives. This form of motive power will be retained until the whole of the London-Liverpool electrification is completed in 1964, to avoid delays through changing locomotives at Crewe.

Films Concerning Industrial Abrasives and Refractory Materials.—The three latest half-hour sound and colour films produced in the studios of the Carborundum Co. Ltd. were shown earlier this week, at the Strand Palace Hotel, London. The first to be shown, "Sparkling Performance," dramatises the enormous value of industrial diamonds in the engineering, stone and glass trades. Secondly, "In the Hot Zone" is a spectacular instructional film on industrial heat control by super-refractory materials. The third film, "In the Rough," demonstrates how the seemingly prosaic subject of the development of abrasives for foundry and other heavy engineering techniques is really full of colour and human interest.

Home Grown Timber Marketing Corporation.—At a press conference held in London last week, Mr. W. D. Butler, Chairman, Home Grown Timber Marketing Corporation Limited explained the objects of the Corporation which was formed in April this year. Made up of timber merchants from all over the country, all of whom are members of the Federated Home Timber Association or the Home Timber Merchants' Association of Scotland, one of its principal and most urgent functions will be the establishment of a permanent and profitable outlet for home grown timber, large supplies of which are rapidly becoming available. Until the formation of the Corporation no selling organisation existed in this country which was capable of handling bulk supplies. Large contracts were lost to overseas supplies simply because of the industry's poor structure and inability to co-ordinate its efforts in handling really substantial business. In its dealings the Home Grown Timber Marketing Corporation will be concerned with the industry as a whole and the success of its endeavours will be to the considerable benefit of the nation's economy.

Battery Research.—Developments which have taken place in the design of storage batteries over the past 10 years have resulted in longer life than was possible in the past, stated Mr. A. W. Browne, O.B.E., Chairman of Chloride Batteries Limited, when proposing the toast, "The Press and Guests," at the Exide Motor Show Press Luncheon held in London on October 21. He mentioned that his company had recently completed a new research laboratory with an area of 40,000 sq. ft. where work on the improvement of batteries would be carried out. Co-operation also was taking place with firms overseas so as to keep up to date with the latest developments. Mr. Alex Bruce, Chairman, the Guild of Motoring Writers, responded for the Press, and Mr. G. E. Liardet, Chairman & Managing Director, Simms Motor & Electronic Corpn. Ltd., for the guests.

Order of St. John Investitures of Eastern Region Officers.—The Lord Prior of the Order of St. John of Jerusalem, Lord Wakehurst, on October 22 at St. John's Church, St. John's Gate, Clerkenwell, E.C., invested Mr. H. C. Johnson, General Manager, British Railways, Eastern Region, as an Officer Brother, and Mr. E. J. Stephens, Traffic Manager, Doncaster, Eastern Region, as a Serving Brother of the Order. Mr. Johnson assumed office as President of the Eastern Region Ambulance Centre of St. John in February, 1958, in succession to the late Mr. C. K. Bird. Commander of the Order of St. John. He qualified for the First Aid Certificate at Cambridge in 1939. He was admitted to the Order as Officer Brother in February last. Mr. Stephens' association with the railway first-aid movement dates back to 1930, when he was yardmaster at Wath, and was instrumental in forming a first-aid class covering the staff of the marshalling yard. The Worksop team of five goods guards won the Inter-Railways Shield in 1958, the first time that this trophy had been secured for the Eastern Region, or its predecessor railways, for 30 years. He was admitted to the Order as Serving Brother in February, 1939.

Collision at Ardsley, North Eastern Region.—Both lines were blocked just north of Ardsley Station, North Eastern Region, late on October 26, when the 6.12 p.m. Kings Cross—Leeds passenger train collided with a light engine. The locomotive and two coaches were de-railed and 12 passengers were injured.

Locomotive Engineers to Visit Hayes Works of E.M.I. Electronics Limited.—Visits have been arranged for members of the Institution of Locomotive Engineers to visit the works and laboratories of E.M.I. Electronics Limited at Hayes, Middlesex, on December 2 and 3. The visitors will have the opportunity of seeing factory automation aids in use including tape-controlled systems for machine tools, driver-less trolley networks, automatic weighing systems, and several machines for reducing the skill required while increasing the efficiency of process. The production of digital and analogue computers will be seen.

No Sunday Trains on Trent Valley Line During Winter.—To facilitate electrification work, no trains are being run on Sundays, until next summer, on the Trent Valley line of British Railways, London Midland Region, between Rugby and Stafford. Trains which would normally use the main line on Sundays are being diverted *via* Coventry, Stechford, and Bescot. The journey time is increased by some 35 min. Special Sunday bus services operate to the intermediate stations between Rugby and Stafford, to connect at Stafford with services to the North, and at Coventry with services to the South. To enable main-line diversions to be effected smoothly, the local service between Nuneaton, Coventry, and Leamington is withdrawn and a special bus service runs between these points, serving Foleshill and Kenilworth.

Mr. H. C. Johnson, General Manager, British Railways, Eastern Region, receiving the insignia of Officer Brother of the Order of St. John of Jerusalem from the Lord Prior of the Order, Lord Wakehurst

The alterations in the London Midland Region passenger service necessitated by electrification works were the subject of an editorial article in our October 9 issue.

Closing of Goods Stations in L.M. Region.—Mickle Trafford East Goods Depot, between Chester Northgate and Northwich, British Railways, London Midland Region, is to close from November 16. Alternative arrangements for goods traffic will be made at Chester General for less than wagonloads and Chester West for full loads except timber. Full loads of timber will still be dealt with at Mickle Trafford East, and coal, coke and patent fuel as consigned by senders. Launton Goods Station on the Bletchley-Oxford branch, is to be closed for all traffic from November 30. Less than wagonloads will be dealt with at Buckingham Goods and full load traffic at Marsh Gibbon & Poundon Stations.

Former Driver Accused of Damaging Signal Equipment.—A former engine driver of British Railways, Thomas Buck, of Scarborough, appeared before Scarborough magistrates on October 20 on two charges of stealing signalling cable, one charge of stealing a vacuum brake gauge, and two charges of severing and removing signalling equipment from alongside the Scarborough to York and the Scarborough to Whitby (in the North Eastern Region) lines with intent to obstruct an engine. It was alleged by the prosecution that Buck had attempted to sabotage the railway system in the Scarborough area at peak holiday times during the past five years by tampering with signalling equipment. He was committed for trial at York Assizes and allowed bail.

Forthcoming Meetings

November 3 (*Tue.*). — Institute of Transport, at the Connaught Rooms, Great Queen Street, W.C.2, at 12.15 for 1 p.m. Anniversary luncheon. Principal guest Field-Marshal The Viscount Montgomery of Alamein.

November 4 (*Wed.*). — Electric Railway Society, at the Fred Tallant Hall, 153, Drummond Street, N.W.1, at 7.15 p.m. Paper on "Italian electrified private railways," by Mr. P. M. Kalla-Bishop.

November 6 (*Fri.*).—Institute of Transport, Leicester Group, at the Bell Hotel, Leicester, at 7.30 p.m. Paper on "The signalling system," by Mr. S. Ash, District Signals. Inspector, British Railways, London Midland Region, Leicester.

November 9 (*Mon.*).—Institute of Traffic Administration, Birmingham Centre, at the Cosmopolitan Club, Fore Street, Birmingham, at 7.15 p.m. Discussion on the future of British Railways.

November 9 (*Mon.*).—Institute of Transport, at the Jarvis Hall (R.I.B.A.), 66, Portland Place, W.1, at 5.45 p.m. Papers on "Fares Structures":—"Air," by Mr. J. L. Grumbridge, General Manager (Commercial), British European Airways. "Rail," by Mr. A. W. Tait, Assistant General Manager (Finance), British Railways, Eastern Region. "Road," by Mr. A. F. R. Carling, Executive, British Electric Traction Co., Ltd.

November 10 (*Tue.*). — Retired Railway Officers' Society, at the May Fair Hotel, Berkeley Street, W.1, at 12.30 for 1 p.m. Annual autumn luncheon.

November 10 (*Tue.*).—Permanent Way Institution, York Section, in the Railway Institute, York, at 6.45 p.m. "P.B.R. and us," Personal impressions of an Inspector, Sub-Inspector, Ganger and Lengthman.

November 10 (*Tue.*).— Railway Correspondence & Travel Society, East Midlands Branch, at the N.C.S. Guild Room, Toll Street, Nottingham, at 7.30 p.m. Paper on "Great Central Atlantics," by Mr. P. H. V. Baynard, Motive Power Inspector, Leicester Central.

November 10 (*Tue.*). — Institution of Railway Signal Engineers, London Section, at the Institution of Electrical Engineers, Savoy Place, W.C.2, at 6 p.m. Paper on "Lifting carriers," by Mr. E. G. Brentnall, London Midland Region.

Railway Stock Market

A very large business has again been transacted in stock markets. With profit-taking more in evidence, price movements were less uniform, though many industrial shares reached new record levels. A factor which made for caution was the request by the U.S.A. for the removal of remaining restrictions on imports of dollar goods, which means increased competition from American goods in export as well as home markets. Financial results and dividend announcements moreover have come as a warning to stock markets that difficult conditions persist in some industries.

There were again trifling movements among foreign and other railway stocks, which attracted only moderate business. Canadian Pacific at $47\frac{1}{2}$ compared with $48\frac{1}{2}$ a week ago, though the 4 per cent debentures, which are a sterling security and reflected the rise in British Funds, were two points higher at $66\frac{1}{4}$, while the 4 per cent preference stock has been firmer at $57\frac{1}{2}$. White Pass shares were steady at $13\frac{1}{4}$.

Among shares of locomotives builders and engineers, North British Locomotive, which fell heavily a week ago after the warning that it must be some time before dividends can be resumed, have rallied from 7s. 6d. to 9s. 9d. Birmingham Wagon were good, having risen on balance from 31s. 6d. to 33s. Moreover, Beyer Peacock 5s. shares strengthened from 8s. 3d. to 8s. $7\frac{1}{2}$d. and elsewhere, business up to 19s. was recorded in G. D. Peters, Wagon Repairs 5s. shares kept at 9s. 6d. Gloucester Wagon strengthened from 14s. to 14s. 6d. Westinghouse Brake remained active, but at 52s. 3d. lost 1s. of their recent rise. The cut in the interim dividend from 6 per cent to $4\frac{1}{2}$ per cent put Babcock & Wilcox down sharply to 45s. 3d. compared with 52s. a week ago; earnings have been affected by increased expenditure involved in atomic plant work. Ruston & Hornsby have risen to 27s.; a week ago they were 24s. 3d. Ransomes & Marles 5s. shares fell 5s. 6d. to 24s. following disappointment in the market with the unchanged $17\frac{1}{2}$ per cent dividend. Net profits of £609,396 compare with the previous year's £666,581, but earnings on the ordinary capital were more than 49 per cent.

Charles Roberts 5s. shares at 15s. 3d. lost 6d. of their recent rise. Pollard Bearing 4s. shares at 34s. 6d. have been well maintained, Dowty Group 10s. shares gained 2s. at 42s. and Pressed Steel 5s. shares advanced further from 37s. 3d. to 39s. $1\frac{1}{2}$d. Vickers have reacted from 31s. 9d. a week ago to 29s. $10\frac{1}{2}$d. Carrier Engineering 5s. shares advanced 2s. to 73s. 9d. and Metal Industries were 1s. 6d. higher at 63s. 3d.

Steel shares again displayed great activity, and showed some further gains on balance, despite a good deal of profit-taking. Stewarts and Lloyds after reacting rallied to 54s. 9d. on the terms of the rights issue. New shares are offered at 40s. each and will bring in £14,000,000. United Steel were 65s. the same as a week ago but Colvilles at 54s. 9d. compared with 56s.